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ABSTRACT

This booklet is the second of a series of 16 booklets that together describe and present findings for a study which involved field observations and a survey of science teaching and learning in American public schools during the school year 1976-77. The study was undertaken to provide the National Science Foundation with a portrayal of current conditions in K-12 science classrooms to help make the Foundation's programs of support for science education consistent with national needs. Eleven high schools and their feeder schools were selected to provide a diverse and balanced group of case study sites. One field researcher was assigned to each site and instructed to find out what was happening and what was felt important in science (including mathematics and social science) programs. The case study report from the "River Acres, Texas" site is contained in this booklet. (MN)

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EDUCATION

Constance Bowen &
Mary Rivkin

Booklet I
Some Still Do: River Acres, Texas
Terry Denny

SE 024 417

Table of Contents

Booklet 0
Overview

Chapter A Overview of the Study
Chapter B The Context of Precollege Education in America Today
Chapter C Methodology of the Project

Booklet I *Terry Denny:* Some Still Do: RIVER ACRES, Texas
Booklet II *Mary Lee Smith:* Teaching and Science Education in FALL RIVER
Booklet III *Louis M. Smith:* Science Education in the ALTE Schools
Booklet IV *Alan Peshkin:* Schooling at BRT: A Rural Case Study
Booklet V *Wayne W. Welch:* Science Education in URBANVILLE: A Case Study
Booklet VI *Rob Walker:* Case Studies in Science Education: PINE CITY
Booklet VII *Rodolfo G. Serrano:* The Status of Science, Mathematics, and Social Science in WESTERN CITY, USA
Booklet VIII *James R. Sanders and Daniel L. Stufflebeam:* School Without Schools: COLUMBUS, Ohio's Educational Response to the Energy Crisis of 1977
Booklet IX *Jacquetta Hill-Burnett:* Science in the Schools of an Eastern Middle Seaboard City
Booklet X *Gordon Hoke:* VORTEX as Harbinger
Booklet XI *Rob Walker:* Case Studies in Science Education: GREATER BOSTON

Booklet XII
Findings I

Chapter 12 The Various Aims of Science Education
Chapter 13 The K-12 Curriculum
Chapter 14 Pluralism and Uniformity

Booklet XIII
Findings II

Chapter 15 Student Learning
Chapter 16 The Teacher in the Classroom
Chapter 17 The School and the Community

Booklet XIV
Survey Findings

Chapter 18 Survey Findings and Corroborations

Booklet XV
Executive Summary

Chapter 19 Knowing and Responding to the Needs of Science Education

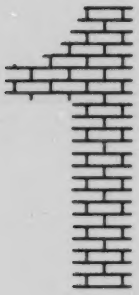
Case Studies in Science Education
A project for the National Science Foundation
conducted by CIRCE and CCC
270 Education Building
University of Illinois at Urbana-Champaign

BOOKLET I

SOME STILL DO: RIVER ACRES, TEXAS

Terry Denny
University of Illinois
Urbana, Illinois

March 1977



River Acres is a school district serving diverse kinds of "suburbs" of Houston, some of which are old agricultural communities engulfed by the rapid sprawl and others, newly created communities complete with country club and look-alike mail boxes. Itself in a state of tension, due to the absence of an integrating sense of community, this school district has grown and now shrinks a little in response to the unplanned emergence of new senses of community identity. Though barriers of race, language and culture may remain firm for many years to come, River Acres High School and the feeder schools of the district do much to overcome them.

Terry Denny pictures the large-scale dynamics of the River Acres Independent School district with a broad brush, but he sketches in also the fine detail of inter personal interaction and private philosophy. New open-space buildings, older classroom buildings, a drive for success for each child each day, and a strong segregation of pupils by "level" provide a framework in which teachers can teach facts or watch for what's left when facts are forgotten, in which science can be personalized or depersonalized, in which new courses (marine biology) can develop and in which many can declare "We never left the basics." Through all the forest and the trees, a theme emerges that is more Southern and Eastern than Western -- the community cares about young people, teachers embody that caring, and they never shrink from expressing it in one way or another. The picture of mathematics, science, and social studies that emerges is more a picture of teachers than of curriculum, of a culture than of disciplines; but it is very real.

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SOME STILL DO: RIVER ACRES, TEXAS

Terry Denny

A GENTLE CRAFT

The reader should know that I have taught in the elementary school and the university over a period of twenty-one years. I also have four children who have completed their high school education in the public schools. I was born and raised in Detroit and have lived most of my adult life in rural/small town university settings in the Midwest.

I am fascinated by what people do in schools and what schools do to people. My task as I saw it was to describe what people said and did about the teaching and learning of science and mathematics from kindergarten through twelfth grade in the River Acres Independent School District, a suburban/rural setting in the Houston area. Not to evaluate it. Not to do anything about it. I once agonized over writing recommendations for schools I had evaluated or researched. Worse, I was nagged with the persisting question, "Was anything ever done? Tell me if anything was ever done." I now rarely write prescriptions for teachers.

The information for this story was gathered on site from October 17, 1976, to December 18, 1976. I listened to 140 teachers and 90 students; over 20 administrators and 60 parents. I also interviewed six counselors and spoke with cooks, janitors, bus drivers and secretaries.

I went to Texas with no personal preference for self-contained classroom instruction, for open-space instruction or for homogeneous grouping of students. Moreover, I am uncertain of the relative social importance of the school subjects as we commonly know them.

It pleases me to write this story without the additional burden of formally judging the merit of the teachers and practice I observed. The fact that I was there and not you is of huge importance, of course.

The Study

Seeing may be believing, but I need more. I never see the picture worth a thousand words. It occurs to me that a very few words can represent a thousand pictures; can represent unobservable feelings; can reveal tomorrow's hopes and yesterday's fears which shape today's actions. My story is largely teachers' words. Students, parents, administrators and others with something to say about River Acres contribute to its telling. But it's mostly a story of and by teachers. It wasn't supposed to turn out this way. The deeper I went, the more I needed a place to park my mind to keep it out of trouble. I found it in the teachers' words.

I began my study by looking at science instruction and then interviewing teachers and students about what they did, why they did it. Hour after hour I saw teachers working, doing what teachers always have done. Students fell into their rightful places, too. Frequently after an observation and interview, a teacher would say something in a few sentences that summed up several hours of observing for me.

Teachers would say their piece, I'd tape it or write it down, and then I'd read it back to them. They'd say, "Hey, that's a good idea. But the parents would never go for it." Or, "That sounds too radical." When I'd say, "I am going to mention it in my report," I heard, "Okay, but don't mention me." The one I liked the best was, "Okay, you be the second Joan of Arc and I'll come behind and beat the drums."

I interviewed teachers in their rooms, hallways and lounges from 7:15 a.m. through 10:00 p.m.; in lobbies of restaurants, dermatologists' offices, and hairdressers' salons; on hall duty, on playground duty, on lunchroom duty or bus duty; before school, during lunch, after school, on Saturday and even on Sunday; at board meetings, and PTO Thanksgiving and Christmas concerts.

After a while I stopped bringing students into rooms for interviews and started talking with them after school; at a basketball game, for example. I put away the project's observation schedule and just "hung around" school. I ended up listening to social studies, science and math teachers talk about themselves, about their own children, their students, their dreams, doubts and dilemmas. In the course of five weeks I filled twenty spiral hip-pocket notebooks. Teachers filled about fifty hours of my cassette tapes. Since then I have read and listened to their words again and again. It is incredible what I hear the second or third time around. My observational notes pale in the strength of their words. So, I shall go with the teachers' words. Res ipsit loquiter, more or less.

Houston

Poet Linda April Raines writes about her city: "In case you missed it, the time to study Houston was now." I feel the same way. Houston caught me by surprise. Nothing I had been told or had read prepared me for what I heard, saw and felt.

You will have to be there to get a larger sense of Raines' poetry, which continues:

> In the melodrama of those
> Fast years
> As the innocents and city
> Slickers entertain each other
> While balancing out the responsibility
> For raising a baby monster

Houston is activity, growth, optimism, in no particular order. Houston is an improbable event: i.e., a sluggish meandering bayou was transformed into a channel to the sea, thereby making Houston a world-class seaport fifty miles from a seashore. The city of today shouldn't have occurred. Infested with mosquitoes, heat, floods, and Indians, a mysterious "will" quite likely made it happen and continues to make it happen. In the nineteenth century, as late as around 1868, the provisional governor of Texas, General Phillip Sheridan, wrote, "If I owned Hell and Texas, I'd rent out Texas and live in Hell." So much for the mid-nineteenth century. In the last seven years, 150 international corporations such as Exxon, Texaco and Shell have moved their headquarters to Houston, our national space center. Space: the final frontier, as Star Trek has taught us.

Houston's population has been doubling each twenty years in this century. Growth is constant. Many demographers say it will be THE city of the late twentieth century. The migration of talent, industry and capital to the South in general and to Houston in particular reminded me of the "high-rolling sixties" in the North. In the lifetime of Billy R. Cullom, a child born in the River Acres School District when this study was conducted, Houston may become the world's largest city.

Texas is over 80% urban -- although outsiders consider it rural. The 1970 census revealed only three states have more urban-centered populations (Illinois, New York, California). Houston feels less like a city and more like a huge town to me; much like Detroit did in the thirties, and Los Angeles does today.

I was reminded by the Chamber of Commerce that the first word transmitted to earth from the moon by Apollo II was "Houston." A school board member shook my hand and quickly told me that "We are the energy capital of the United States; the petro-chemical headquarters of the world; the proud possessor of an internationally famous medical complex (achieved in less than twenty-five years)."

Fifty years ago Miss Ima Hogg, daughter of the first native-born governor of Texas, purchased several Kirchner water colors, Pissaro drawings, Toulouse-Lautrec drawings, Modigliani oils and prints by Manet, Cezanne and others (while in Europe in the twenties). For half a century or more, Houston has had its literati.

There is more: from the world's first domed stadium to a first-class symphony, opera and ballet complex. "First," "world-class," "nationally acclaimed" -- frequently used words in Houston and appropriate, for the most part.

The average age of its citizenry is the lowest of any principal city in the United States. That Texas drawl is apt to mask the face of a mover and a shaker. But the immigration is not necessarily politically progressive. Very conservative young Yankees are coming, too. It is a "buyer beware" city. No zoning. Anything the traffic will bear. Futurologists are having a field day with Houston. Forecasts range from King City of the U.S., to a Club of Rome prophecy that "It has seven years until it blows up."

Come rain or come shine Houston basks in a healthy building climate. While builders in other major cities must plan housing starts so their crews are indoors by November, I saw many new starts occur during the last week of my visit (December). Lot and labor shortages are the only problems which appear in the newspapers. The important commodity of money is not in short supply. There appears to be no end to the constant tide of buyers for the new $100,000 homes being erected in suburban Houston. In-migration figures show Texas leading the nation with Houston gaining 60,000 plus per year. Harris County estimates an increase of 35,000 new jobs in 1976 with no sign of tapering off in 1977-78.

Residents enjoy the absence of state and local income taxes and the Texas property tax structure puts it in the bottom 10% of the nation. Add to this the datum that Houston's rate of unemployment was among the nation's lowest in 1976 and continued to be during the time of this study. The economic future is bright for Houston, for Texas.

"Modest"$45-50,000 homes and "luxurious" $100,000-and-up developments--way up--are common. One such, Pecan Grove, reaches for immortality with its soaring ionic-capital marbled columns and its decorative font. Its Texas-sized billboards with golf-course green background and white letters simply state "Incomparable Pecan Grove."

On the north side of a major artery through River Acres graze a herd of Santa Gertrudas cattle; on the south side several hundred technicians are corralled in a modern computer plant. Cabbage and pineapple palms grace school patrons' front yards along with several species of cacti. Other reminders of climate are the inboard/outboard motor boats that dot the neighborhood and the windowless, air-conditioned school buildings.

Proud of its past, optimistic about its future, confident in its ability to get the job done, Houston is something else. When I asked a restaurant owner how Houston was going to manage all this rapid growth he nonchalantly replied "Storms never last." The spirit of Houston sprawls to its suburbs and its schools where Frederic Remington's cowboy paintings and Houston Mission Control pictures share wall space with Lyndon Baines Johnson.

RIVER ACRES INDEPENDENT SCHOOL DISTRICT

Taxes have tripled in five years for some River Acres homeowners. The school district passed a $25 million bond issue two to one in 1975 and looks forward to its next one with confidence. It is building an athletic complex which includes a 10,000 seat stadium. New schools are being built and opened at least annually. The staff in the district is almost exclusively Texan. For example, the high school principal estimates two of his faculty of 161 are from out of Texas.

The problem in River Acres is how to manage growth--not decline. The reader who loses track of this fact will find much of this study unintelligible. The district has 181 square miles and over 13,000 students. It has had the acreage since 1960 when it began its first year of operation, following a 1959 consolidation of smaller districts. Approximate enrollments show the saltatory leaps which have occurred: 1960, 2,500; 1965, 4,000; 1970, 5,000; 1973, 8,000; 1975, 10,000; and 1977, 13,000. Projected figures for 1978 are 15,000; for 1980, 20,000; and for 1984, make a guess!

The student body has shifted rapidly, too. A student body with an Anglo minority and about 25% of its graduates planning to attend a college or university has become a 70% Anglo majority within a student body of which 75% are college bound. A part of the in-migration has been "White flight," a part is urban flight, and others come from Texas communities; and increasingly the district growth is due to corporation transfers of families from other states--principally the North. The first cadre of out-of-Houston "immigrants" to River Acres K-12 will graduate around 1980. Every other week River Acres acquires what amounts to a new classroom of students in the district.

The general increase in enrollment has included an average increase of about 300 minority students annually for the past four years. Lower student achievement for minority students--principally Mexican-American (20%) and Black (10%)--when compared with 10% Anglo students, has been noted over the years at all grade levels. About a third of the students are below grade level in their math or reading achievement scores (1.2 to 5.6 years by the tenth grade); and in this low-achieving group, two in three are minority children. The minority student achievement patterns are accompanied by high dropout rates and a "lack of motivation for traditional and remedial school programs."

There are a few bilingual teachers in a few of the elementary schools. Although I observed a first grade teacher (Anglo) conducted school in Spanish, the district does not have a bilingual education policy. The principal of an elementary school can decide whether or not to offer part of the school program in Spanish.

In spite of its enormous growth, the district manages to stay within the Texas state standards for class size. District schools are categorized as elementary (grades K-5), junior high (6-8) and high schools (9-12). A teacher in an elementary school may have thirty fewer children in grades one and two and no more than thirty-five in grades three through five. In the secondary schools (grades 7-12) there can be no more than thirty-five students in a class and no more than 750 "pupil periods" per week (five periods of thirty students in a class for five days). When these state limits are temporarily exceeded, the River Acres staff seems to roll with the punches, knowing relief is in sight with the imminent opening of another campus. Furthermore, Texas accreditation standards are exceeded in mathematics, social studies and science course offerings grades 7-12. The standards include instructional clock hour minima for grades 7 and 8.

Every urban district in the state of Texas is being redrawn. The move to consolidation of school districts has been arrested. In fact there is a counterswing: secession is the word of the day. River Acres is facing the possibility itself, as we shall learn. Two additional omnipresent legal themes are equal opportunity and desegregation. I heard that Region IV, which serves River Acres, may be sued for lack of Black and Mexican-American representation on its board. It has some seventy-odd voting members with one Black representative. (The region provides computer services, audio visual materials and in-service training for its public school district constituents.)

Public library shelves reminded me of where I was: Houston, History of A Giant; Regional Vocabulary of Texas; Barbs, Prongs, Points, Prickers and Stickers (barbed wire); The Cowboy Reader, Sea Shells of the Texas Coast; The Alamo; The Indians of Texas; Indian Fights and Fighters; Texas, A World in Itself; Trails and Trials of a Texas Ranger; 6,000 Miles of Fence (The XIT Ranch); Border Wars of Texas, Lone Star; Texas Ghost Towns; Imperial Texas. Texans from my generation are proud of Texas history.

Emergency textbook shipments are a common occurrence in River Acres. They signal the alleviation of a crisis. A persistent problem is keeping textbooks in the hands of its students. Staffing and space are more obvious problems that are a part of the rush of district life. Some may be getting left behind. An older teacher told me she felt uneasy about the changes underway:

> *I'm proud to have lived in River Acres. It is a very important thing to me to be from here; from Texas. My ancestors helped settle it and my roots run deep. My mother was a teacher. I owe something to somebody else because of my experiences. In a way we have simple values. We value friendship; we want to be easy-going; we like closeness . . . and yes, smallness.*

Before exploring the elementary, junior and senior high schools' science, mathematics and social studies curricula, I choose to present several dimensions which characterize the entire district.

The Administration

Many of the district's top administrators have come to their positions through coaching. Coaching is highly respected work in River Acres. How surprised I was to hear an elementary school administrator greeted, "Good morning, coach!" It occurred again at another elementary school.

Principals joke and are at once serious about their former coaching work.

When you get to where you can't coach anymore they make you a principal. And what is wrong with that? Coaches have to have leadership skills, be able to take pressure, be able to work with youngsters; know what it means to not get something worked hard for. Does it seem unreasonable that these are not useful in being an effective principal?

While former coaches-turned-administrators may joke about their plight, former subject matter specialists often do not. I know four administrators who felt they had made a "mistake" leaving the classroom for whatever their reasons. One telling comment from my notebook says it all: "I used to think of myself as a crackerjack teacher. Now I am a mediocre teacher and a bust as a department head."

For the most part the teachers have no idea who the central staff are or what they do. A teacher of over five years in the district speaks:

I really don't know what they do in the district office and I suppose they don't know what I'm doing either. That's the way it has to be in a big district. What will it be like in a few more years, I wonder?

There are the usual host of petty grievances associated with a school administrative bureaucracy. "Our records are not kept for teaching. They are for show--and who's looking?" A few registered complaints about the sign-in/sign-out daily log sheets which teachers must use. One wag suggested it was proof positive that "Someone from kindergarten teaching finally made it to the top." Other tensions were manifest when a principal observed that: "Our communication with the [land] developers is not perfect. We acquire a site in anticipation of development in one spot, it occurs in another." And a member of the central administration team confided that: "We do have an administrative communication problem where a lot of things happen too late."

A minority but potentially important view of the central administration was voiced by a small group of parents after an elementary school parent-teacher meeting one evening. They felt the district was in control of the "old boys who ran a paternal shop." They said they were actively working toward its demise. I failed to follow up their comments.

Each school I visited had its resident dissident(s). About the only thing they shared in common was their view that the district had an inflated reputation for the quality of its educational services. More often than not the informant(s) had taught in other districts, which may lend some credibility to their observations. Illustrative of their message is the following one which was delivered in a junior high teachers' lounge with several colleagues listening.

The district's reputation is excellent and false. It may have been good ten years ago when things were small and close knit. [One old pro nodded in agreement to this.] People may have known one another. The times were better and cooperation may have been high. But that was <u>then</u>. Now the district is literally muddling along with PR-[conscious], not a program-conscious administration.

At a board of education meeting I watched the superintendent show fingertip knowledge of building construction and production schedules: facts, figures, dividing lines. Precise bus routes required long discussion by the board. "66¢/mile to operate a bus." "1975 bus mileage equivalent to going around the world thirty-two times," one board member calculated. "And they didn't go anywhere," quipped another. "And they're [parents] still mad as hell at us," volunteered a third.

Chairs and seats for the new stadium, field house and buildings were "tested" for ten minutes. Levity, much discussion ensued. After the meeting one instructional staff member said, "It's tangible, football and important stuff. A curricular budget issue would not be tested with as much enthusiasm."

No regular K-12 faculty attended the board meetings. I did. Few, if any, citizens did. Administration and athletic faculty were there. (One thousand citizens at an elementary school PTO and none at the board meeting.)

River Acres, on the move, changing, but still River Acres. Susan Bright could have been describing it for me.

JUNCTION-STREAM

at the corner
of barton creek
and the lower
colorado river
black grackles
haggle over
ginger cinders
and rivermist
longarmed liveoaks
archdown
to the riverbelly
swollen
from flashfloods
water settles
waterholds
the earth together
wind here
clears the spirit,
a soft cloud
blows over austin
renoir city
rain on porcelain
carved a head once
sentry
for the riverwalk
it's gone
wind's glazed
with cooking grease
i feel engines
shake the land
building building
marketplaces expressways
longwords
in autumn
mallards stop here
waterholds
the sky together
waterholds
a man together
met a social scientist
how does it work?
i asked
can you stop it
no he said

Susan Bright

In general, the administration sees itself as being "caught in one hell of a mess, but coping." One senses that "the next building" is always present in the district administrator's mind. They talk about five-year goals while knowing that one year is long-term planning. The management of growth in a setting where everything seems to be changing can be maddening. Seymour Sarason taught us over a decade ago that the paradox of school change is that "The more things change the more they remain the same."

Because they are thin in administrative personnel and virtually barren in curriculum supervision, they look to devising an accountability system that will improve quality control. They look to accountability but some have their personal doubts:

> *Accountability will bring us hell, not help. We need to be working with teachers, not checking on them. After twenty-nine years I come to this: we are, in general, highly defensive, rigid people in education. Compulsive people perceive constructive criticism as personal criticism. It permeates our entire educational system. Education is generally a negative enterprise toward children, toward teachers. It is a highly structured reward structure which emphasizes the negative. Those who get rewarded (teachers and students) are those who make the fewest mistakes. That's how you get to be a successful student, teacher, assistant principal, principal, on up.*

Although accountability is not a large issue among the teachers in River Acres (as yet), there was increasing reference made to it as I went from the elementary to the junior and senior high schools. One junior high teacher was sure "they are going to compare us with Westland with the accountability scheme they're cooking up." Another junior high mathematics teacher was fearful that accountability would mean comparing teachers' successfulness without regard to the instructional levels they were assigned to teach.

> *There is no way to motivate a certain number of kids. They put forth absolutely no effort. I will not be held accountable for teaching an unteachable student. Kids need to learn that if you do nothing you get nothing. . . .*
>
> *Why is accountability the teacher's responsibility? Why is it always my job to solve every problem a child manifests in school? I am not in charge of the math program. So how can I be accountable for it? [When I am assigned the lowest groups] I am not teaching what I could teach best.*

Rules

The concept of the rule is large in River Acres, in Houston. Always be within the law. Don't attack the law, but get it done within the law. River Acres School District is known for its unequivocal policies re student behavior, student discipline. The faculty are generally very appreciative of the policy, as are the parents whom I met. The district is not beset by student use of dope or booze; nor is vandalism a problem. Windows are in place, student toilets are clean and hallway speech is remarkably free of the language of the streets. "Only paddling on the buttocks with a paddle . . ." was adopted by board of education, July 1974, as a part of the board's behavioral policy.

The Parents' Handbook pleases many when it says under "Unwritten Regulations":

> *Each year there are a few distracting things including some "fads" that show up on our campus. We are not listing any of these nor are we making a regulation to cover all problems that may arise. When any "fad" gets started on our campus*

and a "nuisance" develops, we shall immediately eliminate that nuisance. ANYTHING THAT DETRACTS FROM THE SPIRIT OR DIGNITY OF RIVER ACRES SCHOOLS WILL BE CONTROLLED.

Planning

River Acres believes in its ability to provide good schools for most of its children. It believes it will weather the currently deeply felt growing pains. It also believes that to achieve these and other school ends it must be better organized. Its schools are large, roughly 1,000 in an elementary building, 1,500 in a junior high, 3,000 in its high school. Better organization is going to result in better schooling and the role of planning is central in the minds of its district officials. One effort which is meeting with mixed success is an attempt to get written descriptions of its science, math and social studies curricula in an orderly fashion. Curriculum guides have been developed by personnel working after the school day and after the school year. In its attempt to use a uniform format for spelling out objectives, activities, and evaluation in these guides, the district has met with foot dragging and considerable latent hostility by teachers who see no use for such efforts. An overwhelming number of the teachers see them as, at best, irrelevant to their work. One fifth grade teacher said, "I wrote my way to a [master's] degree using those behavioral objectives and I haven't had a mind to touch one since."

The importance of planning is also stressed in the district's Faculty Handbook.

When days go badly, check to determine whether your plans were adequate. Chances are they were not.

The Program. (first item) "Have the instructional program so carefully planned that there is not time for major problems to develop. Account for each minute of the day in your plans."

For all the talk about planning at the district level, the facts are that River Acres pretty well runs itself educationally at a building-by-building level. Some love it, most accept it, some disparage this condition. One principal offered a prescription for changing the district confederacy to a more centralized educational program.

You want to know why I'm boss here? I'll tell you why I'm boss here. Because I have authority. You need coordinators [at the district level] with real clout if you want an integrated, funnelling program. You need people with authority, not with "supervisory" capacity. That's the way things get done in Texas. Until that happens each principal will run their [sic] own school the way he wants to. When the Associate Superintendent speaks, we do it. The others muddy the waters.

Planning can be attractive to teachers, too. Not so much as a district-wide strategy, but moreso at the building level, and especially in the individual classroom. River Acres teachers perceive their largest needs as being instructional materials and tactics for grabbing and holding students' interest, thereby minimizing discipline problems. Whenever planning addresses these concerns, it generates teacher interest. The teachers who had experienced NSF support were unanimously high in their praise of their experience and called for more.

The NSF should continue to support subject matter institutes in the summer for teachers who want to change what they are teaching. There's no substitute for knowing the subject matter of what you're teaching. It took me eight summers to learn earth science--plus four field trips to the same place before I really felt comfortable with geology.

Parents

The attendance at school meetings and social functions is outstanding. Nearly 2000 parents attended a spring physical education open house in 1976. During my visit I attended several parent-teacher evening presentations, each of which was heavily attended by hundreds of parents. This was in sharp contrast to the two school board meetings attended by a handful of citizens. I must note in passing that during my study a small city within the district was organizing to secede from the district to form their own. A special election was held and the secession was approved. The issues were not discussed in the papers nor at the board of education meetings. The matter of citizen involvement in the politics of the schools remains a puzzlement to me. I overheard a coffee break comment by a central administrator that "parent involvement makes district administrators very nervous."

Parent involvement in the direct schooling of their children is large. There is pressure on teachers to succeed. The citizens expect it. They communicate it through complaints about their children's grades, in their doubts about open space instructional environments. Parents of junior high school students said very little to me about their expectations of the high school. They sensed that its reputation was good. This is noteworthy in that some spoke at length, with negative feelings based primarily on hearsay information, about the district's elementary schools, which their children also had not attended. The district administration corroborated my impression that a vast majority of its patrons' school concerns dwell on the elementary and junior high schools.

Teach and Student Evaluation

The district requires an administrator to evaluate each teacher. It has a five-page form with opportunity for the teacher and principal to make parallel ratings of the teacher's competence in four areas: personal and professional qualities, classroom management and instructional effectiveness. No mention is made of student achievement or grades or use of instructional materials per se. "Keeps accurate and meaningful records," is one of several points itemized.

Several teachers called for in-service help in working with teams, with open space, too. Meeting this apparent need would present problems for the district, though, in that the high school is predominantly against the concept of open space and one elementary school prefers the self-contained classroom arrangement. These are not burning issues because teachers are not evaluated on their ability to work in an open space setting, or their success as team-teaching members. Nevertheless, there is rather widespread dissatisfaction with the form and the process employed. Administrators are charged with not having visited the class. And the criteria are ambiguous in some teachers' eyes: "Who am I being judged against, God? The poorest teacher in the building? How about judging my competency against the competency of my administrator? As long as we're at it, how about a parent competency test?"

The district in-service program is a modest one. It does not address the major issues brought forward in this study. Again and again teachers new to the profession commented on their dismay when the "paperwork of teaching" confronted them: the forms, legal and administrative record keeping. Further, the concept of a district, how it operates financially, administratively and legally, is pretty much a mystery to the neophyte teachers in River Acres. They are often surprised to find how fine grained the grading system is.

A district-wide grading policy is in effect:

100 - 93	A
92 - 85	B
84 - 77	C
76 - 70	D
69 - 00	F

It has its detractors and there is a small minority of elementary teachers who would abolish grades completely: "We have to. It's our policy. I'm against them. Social promotion means a child should be provided for. A good society would promote good education for all children." For the most part, though, teachers and parents find the grading policy and practice to their liking. Notable exceptions, when grading creates problems in the context of achievement or ability grouping, will be discussed later on. These center on teachers feeling pressure from administrators to award high grades, to flunk no one.

Open Space

Open space is a K-12 issue in River Acres among teachers, parents, administrators, and students. Six of the seven elementary schools are "open space" in architectural design. The seventh is not--nor does its staff want it to be. Advocates of open space schools believe it results in improved planning and teaching.

> *Open space gives you the option of building in space for those who cannot function in open space. [In the self-contained classroom] there is no option for the kids who cannot stay in the room except another room, which is no option at all. Where we usually find problem children in self-contained is in the hallway on a chair--if we're lucky. There are far fewer kids who are sent outside the open space.*

Open space in River Acres elementary schools and in both its junior high school buildings means they have large areas in which the instructional space can be organized as the responsible parties see fit. Instead of eight rooms each with its own entrance and teacher, let's say, we have an enormous area without permanent walls, doors. This area may be used for all sections of a grade (or two) in an elementary building. In the case of the junior high school it can be used for all mathematics teaching, with the students of the three grades moving in and out throughout the day.

Aspects of open space and self-contained settings which are seen to affect science instruction will be discussed. The district administration is committed to open space at present for K-8th grades. Because of the recent rapid and considerable growth in River Acres, most of its school buildings are new. Yet, although its new buildings are all open space, there has been little time to train teachers to work in such a setting, and few teacher education institutions offer elementary teacher candidates help in readying themselves to work in math and science, much less in open space settings.

Each River Acres school is graced with a library and a resource center, which are intended to support the open space concept. Mathematics teachers make little use of these facilities at any grade level throughout the curriculum. Only the odd child will be doing something in them that relates directly to mathematics. For the science curriculum the picture changes somewhat, but not dramatically. A child may have an occasional assignment, but the principal user in science is the teacher of grades four through seven. Before and after those grades, the teacher's use is limited to getting a desired film strip or sound film from the resource center. (A multi-district regional center is the principal supplier of the non-print materials used by science and math teachers.) In the social studies the use of film is considerable by both students and teachers, but I found no patterns of use

that could be called exceptionally heavy or inappropriate. (On rare occasion I heard something akin to "I have some India films--does anybody need a film today or tomorrow?") The junior high schools' lush resource and library facilities were without students most of the time I visited.

> *Classroom teachers know far better than do librarians what resource centers need. That's why you will find lovely facilities not in use; the teachers are not a part of them. The day of the study hall is passing and we don't need these grand facilities just to keep kids busy and quiet, or to get the group size down. We need to get materials kids can use and librarians don't have to guard with their lives.*

Open space can provide opportunities for scheduling flexibility, for team teaching, for cross-grade instruction and the like. Whether it does (or should) is the underlying issue in the minds of many River Acres informants. They will speak for themselves shortly.

Preparation

The spirit of the Samurai is in River Acres schools. If you prefer Parsifal, the Boy Scouts, or Galahad, so be it. Teachers see their science teaching as getting youngsters ready. Preparation for the next grade, preparation for the more difficult courses to come, preparation for college entrance. For life. "If you're prepared, you can take anything life dishes out to you. Getting right with life involves good preparation," one assistant principal offered as the key to elementary school, and more.

One high school science teacher (who has taught math) spoke to preparation with considerable animation.

> *I'll be frank with you. A majority of my students over the past four years are not prepared. They cannot study. They cannot read a mathematics textbook. Their science an chemistry lab reports are generally awful. I have not been pleased with myself this year at all throughout my chemistry courses. When students aren't prepared you are dead. So I fall into doing it for them.*
>
> *Perhaps my materials is too hard? [Offered to have me review it.] My thought is that students today lack the feeling of coming to class prepared; of being responsible for doing good work.*
>
> *Preparation will improve on the student's part if you let them work in pairs. Performance improves dramatically when my 3's [below average] work together. Girls especially "tell" you how they want it [just by looking at them] walking down the hall. They won't even walk from one class to another alone.*

The basics in math prepare one for advanced mathematics; writing and reading skills prepare one for literature and the social studies courses to come. Trigonometry and physics prepare students for their college experience and high school prepares them for whatever follows. Nowhere in the K-12 curriculum do teachers concern themselves with preparation more than in the junior high school.

> *This is it boy; if they don't get it now, they never will! This is the last chance. If they blow it here they are dead ducks. They just have to be prepared for high school or that's all she wrote. There's no turning back, or slowing down a little, or backfilling up there. My job is to help these little buzzards to realize that [the importance of preparation] before it is too late. I get to some, miss others. God knows I try.*

That mathematics teacher spoke for many, many others in the sciences and social studies as well. She works hard at trying to prepare her students and by her own admission is not making progress as the years go by. It is a hit and miss proposition. But the target is clear. In River Acres the junior high school curriculum arrow points in one direction: to Central High School. What the students have been getting ready for is variously described as "the big crunch, algebra"; "where many of the Latin [Mexican-American] students will meet their Alamo"; "the Rites of Academic Passage [re college]"; and, "the end of preparation and the beginning of the real thing."

Eighth-grade students often described it in social rather than academic terms. They see it as, "When you gotta do it, or quit and get a job"; "Where you meet new friends, dates, and sports"; and the time when "I finally get wheels."

Competition

A discussion of the utility of competition as a pedagogical tactic is presented now because it is a K-12 River Acres issue, and it might as well be introduced early as later in the story. I found increasing advocacy for the use of competition as I went up the grades and up the instructional levels. One administrator offered:

> *Competition is great for kids when everybody knows the rules. When competitors can accept their limitations. If I could, I'd eliminate competition in the early grades. . . . I think competition is the most overemphasized thing in athletics and I am a former coach. If [principal] Adams would transfer his energy and coaching perspective to instruction instead of kids and PR, he would be an outstanding instructional leader.*

Another administrator countered:

> *Competition makes the world go around and kids stay on the ball. It is one of the few things we have left that works. If you took competition out of it [the curriculum] you would have downright chaos. Or sleep. We lost our fire for healthy competition because of some mental hygiene theories. So we took it out and put nothing in its place. A terrible mistake. Teachers and parents are too damn concerned with whether the students like them. If that is what is really important to us, we had better get out. Because they [students] will use and abuse that. They know. Like a little blood in the chicken yard. What we need is teachers who like kids, like their subject, teach it like hell's fire and don't give a hoot about whether the kids like them. Competition is good; I guarantee you that. Put that in your notebook under "old-fashioned ideas."*

These are extreme positions to be sure. Most informants said nothing so extreme about competition. But it was mentioned often and employed widely. Competition represents a background dynamic operating in these schools be they open space or self-contained.

A New Crop

A viewpoint which holds widespread allegiance among River Acres' elementary teachers avers the increase of behavioral problems in young children. Some call them "rowdy," "hyperactive." Others use no labels, but point to a 10% figure of early primary children now on medication as cause for concern. "These newcomers are brighter, all right, and they

are more difficult, too," offered an experienced teacher after a particularly difficult day. Another said:

> *Slower kids are getting harder to handle. Slower kids from the wealthy homes are the worst. Not a matter of social class at all. It goes beyond Westland Junior High and this elementary school; beyond Houston. And a new element has really taken hold. Children who are plenty bright enough just do not pay attention. I cannot recall seeing them in such numbers. Finally, the number of children on medication, the hyperactive, is considerable. Every class in this building has children on medication. This has been going on for seven, eight, nine years.*

Teachers' comments are not restricted to the bright or slower children:

> *I am mostly concerned with the average kids who have it and can't get it together. Mother will make excuses for her children not finishing anything. They are just left to grow up in life alone, in their rooms, or with the "tube." They don't even have the streets or gangs to teach them. They just wander. Everything is prepackaged for them. They are so bored, so young.*

A district administrator with elementary school teaching experience suggested:

> *The average student is the one who is getting along, not bothering us, not flunking, and not creating problems for us or the principal. That's what the average student is, and that's the one we quickly forget. There are so many others who do bother us. Their classmates, [who] are not learning, and are driving their mommas and daddys crazy, that we <u>have</u> to pay attention to.*

There's a new crop of parents, too, and the demands they will make on teachers in River Acres are now just being felt. One young mother, born, reared and educated in the East, almost got up on a chair after a PTO meeting to deliver the following lecture for my benefit.

> *Homework that is busy work is trash. Teachers wonder why I don't ask my child to finish it? I don't think it is worth doing, that is why. I want my kid to grow up to be a sociable human being. Every night of the week I have at least two or three things my child could be doing that clearly would give her skills, new experiences, a chance to grow in social and intellectual maturity.*
>
> *When one of the "choices" [long drawl] is some dumb cut-and-paste project or eighteen somethings she clearly already knows how to do, or putting together something that nobody in the world in his right mind could care about--that loses to the more important things.*
>
> *I don't want to minimize the problem. I just <u>hate</u> not supporting homework, the teacher; but when it comes down to doing a silly geography cut-and-paste-the-rivers project and attending the Houston symphony, my daughter will go to school humming Chopin the next morning.*

Teachers are unsure how important these matters are for the future of River Acres. Some believe most primary-school medication problems naturally stop by the end of middle childhood. Others feel that child unrest is national in origin and will change "as our nation returns to peace and prosperity." A few elementary teachers and principals think a source of the new crop problem is becoming too difficult too early. As one fourth grade teacher said,

> *We are pushing too much downward. Fifth-grade cloud formations [science] I learned in high school. A child is required to learn things at the <u>introductory</u> level forever [because we start too early]. The teacher who <u>follows</u> the math manual is inadequate in many ways. I am still teaching the same things to my fourth graders that I did in the first grade.*

A principal at another building saw the 1970 sixth-grade curriculum as now being the 1977 fifth-grade because of River Acres' sixth-through-eighth-grade junior high school arrangement.

An elementary school staff member poignantly expressed her sense of the changing times and the changing children of River Acres:

> *We are going to have to leave the "mother hen" concept in education pretty soon. Kids in the future may move from a resource center to home to other non-school learning environments during the course of a school day. We will never go back to the small community with the insultated school where no one pushed too hard. We wish we could reach back to when 10% of our kids in elementary school weren't on Ritalin and God knows how many of their teachers are on Darvon. We wish we were smaller again. But you see when we were smaller, and I was here, we were not better, we were not more person to person, we had a hickory stick and not much more.*
>
> *The bright kiddos have always learned. We could get away with saying, "You can't do that" and make it stick. I miss that part of it. But we must reach out for something better. We are reaching back to when the purpose of school was clear; when there was time to finish. That's what gets the teachers the most: it's either no time to finish or no help in using the time available when nothing seems to work.*
>
> *It's all starting just about now. We are going to see some teachers crack around here in the years ahead because no one is looking ahead on these things I'm talking about.*

The recent past, present and foreseeable future of River Acres schools will feature student grouping for instruction, the last general topic to be described before turning to the elementary schools.

Instructional Levels

Students are grouped for instruction in mathematics from first grade through high school. In the elementary grades children are grouped for reading as well. In junior and senior high school the students are grouped in science and social studies, too. By the senior year of high school there is an enormous difference between the top group and the second and third groups. Another sizable ability/achievement gap occurs between the third and fourth groups. It takes an exceptionally talented and dedicated student to do top group work in all subjects at Central High School, according to students, teachers and parents. Level one never comprises more than five percent of the class and is often less than that. During the period of this study the high school mathematics "major works" program, as it is called, had between one and two percent of the students in it. (There was no major works program available in social studies beyond a group of twelve students in a highly specialized courses.)

It would be difficult to overestimate the necessity for instructional levels in the minds of many of the teachers, administrators and parents. I discovered early that the most commonly used term is "level"--although some elementary teachers will talk about instructional "blocks" when discussing grouping. (Word labels are important to some. One teacher told me, "Get one thing straight, we have levels, not tracks"! Later in the study an administrator said to use the word "corrective" not "remedial." And the "self-contained" classroom teacher said not to use the word "traditional.")

The Elementary Faculty Handbook spells out district policy on grouping:

Heterogeneous grouping is encouraged for all subjects with exception of mathematics and language arts.

- *The achievement level groups are based and organized primarily on the effectiveness of the pupils' reading and math skills.*

- *Teacher-evaluation, the supporting cumulative reading records, and achievement test scores will be the guidelines in setting up classes.*

- *Cumulative Reading Record cards of skills and enrichment materials will enable the teacher to diagnose needs, deficiencies, or problems and adapt instruction accordingly.*

The lowest instructional level in elementary school often has special education students in it, too. It is not clear how well this is working.

"Special Education" is a word we use for kids that are really pretty smart quite often; in fact, a lot have normal or better intelligence if we tested them differently. They may not hear or see things the way "we normal" people do. We say they "perceive improperly." Sometimes it's three or four little things that we say add up to a school problem for these kids. Still others think very well, very well--but slowly. And everyone knows [sardonic intonation] that you can't think slowly and be bright, right? Still others have times when they simply cannot concentrate, and so on. They really do differ but we call them all special education--or poor students.

A second grade teacher sees grouping children by levels contributing positively to the slow learner. "Because the slow student [sic] can do the work they see they can be proud of themselves. These kids are getting 80s and 90s [grades] in science class."

Other techniques are used to aid instruction by levels. The elementary schools make use of short-term contracts in which the student has a specified number of pages to read, questions to answer and suggested activities to perform. Also, packets of materials have been developed in several subject areas, elementary science being one. They are used by teachers to allow students to work independently while the teacher instructs a group. An enthusiastic user of packets described them:

Remediation can be one-to-one if you have packets. And extra work to keep kids busy is always there. Kids can work in teams. Each kid turns in an activity card to the teacher to be checked. [For math and reading.] We date each time we check. The record of dates when work is complete has proved to be a boon to us. It lets us see who has been goofing off--when there is a lapse of time and no work has been turned in.

A former teacher now an administrator had reservations about contracts:

I am not sure of the success of them. The kids go through the motions but I am sure they miss a lot. Used mostly with upper level kids. Lower level [children] are all teacher directed. We begin in fourth-grade science and [illegible] in math. In fifth-grade science, social studies and math we use them. It takes a lot of teacher time to prepare contracts. Teacher-made materials are required.

A very few elementary teachers are not convinced that River Acres' levels, contracts, packets, and subject departmentalization is the way to run a school. One principal said that most teachers saw that departmentalization improves getting the best subject matter

specialists teaching the most kids. "But [some] see it as an issue of kids versus subject matter. It is both a blessing and a curse. Teachers need to be with their chicks, and vice-versa, chicks need good feed to grow." A teacher in another school agrees: "A good self esteem is more important than achievement test scores, and when you departmentalize you throw away your chance to work closely with youngsters."

River Acres could be counted on to have its articulate dissenters as well as its enthusiastic supporters. A discussion of grouping and levels drew one contrary administrator out:

> *Dumbest idea ever perpetrated on schools. Fewer levels are better levels. The idea of a level is stagnation for starters. There is no such thing as a level. There are adults who need to figure out some way to meet the challenge of different kids. So, we invent the idea of a level. Pretty soon we say it enough that it becomes real. We could have invented learner "types" or "behavior patterns" or whatever and sorted kids out that way. We'd very soon believe in that, too. What we have to get around to here pretty soon is what good are these ideas, levels, and can we show that they serve anything more than teacher convenience.*

A teacher with more than twenty years in Texas schools sees educational grouping principally as a product of school integration efforts:

> *I'm not really for grouping. Grouping in Texas was done only for segregation. That's the year it came and that is why it persists. They can talk all the fancy talk they want to but that's why grouping happened and that's why it's here [in Texas]. This district is probably one of the few exceptions in the state. [Instructional levels are not intended as a segregation tactic.] I've worked with our state professional organizations on this matter and it's common knowledge among them.*

Another administrator of many years' experience caught me unawares when I asked for some reminiscences on the good old days she had seen. We had been talking about the increasing complexity of schooling: contracts, packets, levels, special education, litigation, whatever. She had leveled harsh criticism at much of our "modern adjustments" to school problems.

> *The old ways are a bunch of baloney. I can teach prepositional phrases with Glenn Campbell's records. The times oblige us to teach with an eye toward entertaining children. TV and current events make us have to change with the times. We have to use methods and techniques that work and not stick to things that once worked. Any recreational road to instruction is useful as I see it. The whole concept is molding minds. We must approach the task with flexibility. We must work with children, not against them. The subject of the elementary school is children, not math or science. When subjects are focused on, it then becomes which level to teach. Now every teacher knows from kindergarten through high school that the top level kids learn in spite of you. They teach themselves. So we all want them. We can teach all that good stuff almost by throwing the book in the room from the hall.*
>
> *High achievers learn in spite of you--that's what high achiever means: he has gotten more than what has been offered on the average. The easiest thing in the world to teach is subject matter. That means the kid is ready and able. The fact is that by the end of our school most of our kids aren't ready or able for most of our instruction; they have dropped out, drifted down to the bottom groups or are doing badly in the top ones. I defy anyone to look at a thousand children in RAISD and prove me otherwise. Now the hell of it is we are no different from any other school district. I'm only being honest about it.*

Pretty strong opinion there. Which brings me to the elementary schools and a topic on which there was more agreement than any other in River Acres.

THE ELEMENTARY SCHOOLS

Back to the Basics: Near Consensus

"Good thing" was the nearly unanimous response to my question on the topic of "back to the basics." One teacher captured the prevailing spirit of River Acres when she said, "Back? We never left!"

The meaning of "back to the basics" for science and social studies teachers throughout the grades is increasing reading skills of children in the elementary grades. For math teachers K-12 means learning the 100 basic facts in each of the four arithmetic operations.

There was one exception to this near unanimity of viewpoint. As a key administrator in the district, Mr. Shores surprised me with a discussion of achievement testing, which led to the purposes of schooling and what was basic to it:

> *The quality of student that has been entering our district of late makes us look very good in achievement. If all we did was look at our achievement scores we might as well all go fishing. Sixty percent of our students are above the national norms and half of them moved in since 1970.*
>
> *This creates a very interesting problem. Even though we are organized on a basic skills type program--at least through the eighth grade--I feel most people would prefer that their child be a useful happy citizen who knows how to get along with other people. We are all hung up on back to the basics and aren't dealing with the problem of the development of the child very much. The ultimate goal is for the child to feel positive about himself.*
>
> *In the elementary school we have tried to instill in our teachers that each child experience some success each day. So from kindergarten through five [fifth grade] we emphasize growth of self; from six through eight, the understanding of self with others; and from grades nine through twelve, competition with others. You don't have to emphasize the basics in elementary school. Every child wants to go to school. There are no six year old goof-offs--they want to do the best job they can. In high school kids nearly have to be made to do everything they do. Fear, college requirements, punishment, grades [are used]. Then we say, "These kids don't want to learn. Look--their basic skills are just awful! Look at that spelling! And they don't even want to read! Let's get back to the basics!" I feel we need to emphasize the child more and the basic skill less. When the child is experiencing success he'll get those basic skills as best he can.*

Open Space

"Closest thing to a marriage," said an administrator of her open-space school. She and many others who advocate open space see a chief benefit in the opportunity for two or more teachers to act as an instructional team. The marriage metaphor is apt in that many of the interpersonal joys and pains of marriage were easily seen in the open space schools. Some open space teams were really humming, some were having their problems--a few were "on the rocks." Texas accreditation standards define a "self contained" class as one taught by one teacher for fifty per cent or more of the school day. Open space is not defined. A district administrator pointed to staff selection as one key to success in open space.

> *The ability of teachers to get along with children or adults in any setting is magnified by the open space. This ability is not a part of our staff selection criteria or the teachers' education programs.*

A self-contained teacher who had not taught in open space commented on team teaching:

> *It must occur there more easily than it does here. We do it, but it is tricky to schedule. More minds are better than one mind. That has to be an advantage for open space.*

The management requirements of open space were emphasized by a district administrator:

> *Our commitment to open space requires more management than would self-contained. The team leader is crucial in open space and team cooperation can become an issue. In self-contained it is the principal's word against the teacher. In open space it is possible for a sizable group of adults to be involved in an issue about responsibility. The role of the counselor in open space is preventative. In self-contained it is remedial. I'm not sure that the counselors realize this.*

Open space in River Acres also involves team or grade-level scheduling. In self-contained classrooms a teacher can plan and adjust the schedule to her individual taste. Not so for open space. The benefits and problems were candidly described in words that squared with my observations:

> *Open space means large bays with 120, 150, 180 students. The first few weeks of school are difficult--getting to know the names of children, their personalities, their medication and other special needs.*

An issue-packed balanced statement on open space was provided by a principal.

> *Scheduling is at the heart of the matter. Grouping requires that schedules be followed. So while it cramps your instructional time it assures you of [curricular] coverage. Self-contained allows the teacher to use her time flexibly, if unwisely. Open-space programs [assure] wide coverage and lost opportunity to stretch out a lesson when needed--to cut short when it seems wise to do so. When a lesson is going well in open space and the schedule "speaks," that's it--in self-contained you keep rolling.*

A third grade open space teacher argued.

> *The schedule defeats it. The lower groups are hurt the most by the schedule. They are "turned on" so rarely and it would be good to [be able to] go [on teaching] when they are. But the bell rings.*

Another upper grade teacher said that open space was "perfect for some of my remedial children. They need to move about. But the schedule is working against us." She asserted that more than one period is needed to "really pick up the child who is way behind in reading or mathematics."

The district's Handbook for Parents presents several reasons for its open space building program. Two are:

> *Greater efficiency in personnel utilization which lowers student-adult ratio and allows for more realistic individualized instruction . . .*
>
> *Total staff growth is obviously a part of team teaching. Teachers working and teaching together pick up "tricks of the trade" from one another.*

At the very time when many districts across the nation are "phasing out" open area schools, River Acres is building them as quickly as they are able. The board sees a savings in construction costs and some administrators see an opportunity to change traditional patterns of instruction. One spoke at length on the concept:

> *I get discouraged when professionals emotionally knock something they have not seen, don't understand and won't make the effort to know.*
>
> *I have been in a crackerbox traditional school that was run beautifully under the open concept and have seen [architecturally] beautiful open-space schools run as though all classes were self-contained.*
>
> *If I were teaching in the high school and were satisfied with my work, why would I want to change to open space? I would feel uneasy about other adults observing me daily. What about those "you-let-me-alone-and-I'll-let-you-alone-days" that you can hide in the self-contained classroom?*

Even the most enthusiastic supporters of the open concept agree it takes considerably subtle structure, particularly in the expectations children, parents and teachers have of it. A principal who claimed open space gave her a chance to move children more easily from one level and one class to another also said:

> *Open space takes the very best by all of us. You, parents, colleagues, whomever can see all of us--no matter who you are visiting. When a person comes to visit one teacher all of us are subject to review. Toes do get stepped on. In open space, flexibility is the key. A couple teams almost destroyed themselves. The first question I get from a parent, a new teacher, a visitor is the achievement question. Do their scores stay the same? Drop? [In reading and math, of course.]*

Open-space teachers were remembered by a self-contained classroom teacher who decided not to move to an open-space school.

> *They erect their little divisional barriers, then cubicle off their own instructional space, then color-code their levels, then get their desk right where it used to be in self-contained. Once that is done they are ready to be open.*

Another self-contained classroom enthusiast saw it this way:

> *There just are not profoundly different pedagogical approaches going on in open space and self-contained. What is going on is a slavish adherence to the schedule and a failure to consider the importance of distraction as a problem for young learners. By distraction I do not mean solely oral distraction or the noise! I also mean something a little more subtle, visual distraction. When your friend in another class in open space gets up or gets yelled at, that's distraction.*

And a prophecy was offered by a teacher who had taught in both arrangements:

> *The bright kids will do well or even better in open space. For the average it is a maybe situation. For the slow it is a disaster.*

A second-grade teacher missed "her kind of sounds" when she visited an open-space school:

> *It is reminiscent, faintly, of the one-room schoolhouse with its grades all together . . . yet separate. There's no singing in open space. And laughter must be kept down, too. Think about that. When you sing in open space you have to bother the others. While it doesn't happen very often it is important to be able to go out and read under the pecan tree when the right moment arrives.*

Another teacher (fifth grade) who was positive toward open space reported parental resistance:

> *"Sit-down-and-be-quiet" parents can be counted on not to like open concept. It is interesting to see how the child who may be hurt by open concept usually has the parent who never shows up.*

The parents I spoke with at several parent-teacher night meetings were over-whelmingly in favor of the organizational arrangement their child was in: self-contained or open space. (I did not find parents with children in both settings.)

> *Someone is teaching my daughter a lot of good astronomy. She eats it up. I am amazed at what she is learning in the second grade. (He is an electrical engineer.) (Northerner)*

> *My son was behind in his basics in arithmetic. The teacher helped us, recommended flash cards. It was a long last year, but he has caught up now. I think the math program is terrific. (Texan)*

For many who teach in open space the appropriateness of the concept is a matter of the needs of the child. A winner of the district's award for excellent teaching said:

> *Self-contained versus open concept is a question of the child. In general open space suits far more elementary children then it does not. Distractable learners need self-contained classrooms. If the child is suited for open space it means I can do much more with him. The big difference for me is the goldfish bowl. There is no place for me to goof off--to be lazy.*

A claimed, long-term benefit of open-space instruction is that more science and social studies instruction takes place. The teacher cannot delete one or the other from her schedule because she wants to teach more reading (or whatever), as she can in the self-contained classroom.

An unusually strong claim for open-space education came from an administrator of many years in the district.

> *We really believe in the potential of open education. By stressing individualized instruction you get what we all want: the basics taught, each child gets his individual liberty guaranteed and the slowest and best child get their chances to move forward. Individualized instruction can really be what America needs in these troubled times. Good programs and good materials can meet individual needs beyond the most fantastic dreams of any educator.*

Those who regarded open space as success could see historical relationships between it and their teaching specialty. The physical education teacher suggested:

> *If you think about it, PE teachers have always had it. They have combined classes, broken classes down for skill training, ability grouped where necessary. PE teachers get such a bad rap from the academic teachers that they probably couldn't admit it.*

And a kindergarten teacher reminded me that pre-school and kindergarten teachers have long embraced the open space concept.

Other reasons which underlay support included the teacher's need for activity and working with others:

> *I love it. I am an active person. I love to work with others. I'll say for certain I'll never go back to teaching self-contained. The ideas of three others [teachers] are almost always an improvement on mine alone when it comes to teaching. But I will say thirty-minute blocks are not enough.*

I met with a group of four elementary teachers who provided this summary statement:

> *We have so many things going on here. We can see more progress here [open space] as teachers. [All could compare with self-contained, direct experience.] Problem is individualization is restricted in self-contained room. If you think noise is a problem or distraction is a problem out here, try to do more than one thing that is noisy in a self-contained room. Here we can learn from another teacher; the child can and does, too. [We] can see what others are doing. "Am I getting it across as well as she?" It's a lot more helpful than hurting. Sharing ideas. We have weekly team meetings as a primary team. And it is no big deal to walk in. Others can help you when you need to go off for a brief period. The people who invented self-contained classrooms think teachers have twenty gallon reserve bladders.*

A primary team leader has watched her second graders become fifth graders in her school's open space setting and is extremely pleased with them and the arrangement. "I go over to them and tell them how proud I am of them. Don't let me down," she said. Two other teachers in that school come over to the lower grades and tell them they "can hardly wait to be with them next year." Another class of second graders has been over to "meet the third grade section" and to talk about what it is like.

Two teachers new to open space are not convinced:

> *If you'll look carefully at our open space elementary schools you will find close, self-contained classes set in a large, open area. Parents, too, want close, personal contacts between teacher and child, especially at the early years in elementary school. "Little people need a central person to call their own." Teachers in both settings in the elementary schools say, "We are teaching basic facts in arithmetic, doing experiments in science." Both use activity packets, contracts which call for a certain amount of work on the child's part. Both emphasize pacing, grouping by level for arithmetic, very sporadically in science and never in the social studies.*

For what they are worth I noted:

1. Open-space teachers appear to be on their feet more than are self-contained classroom teachers;

2. Teachers in self-contained appear to make more use of chalkboards;

3. There is more noise in open space than in self-contained rooms;

4. There is more student movement in open space.

I asked teachers about student freedom to move within their area. In one school a teacher said open space has long been a traditional idea in kindergarten.

> *Now it continues in the first couple grades. Children are free to walk around if they don't bother their neighbor. Bang, comes the third grade! [And less of that freedom.]*

It is difficult to avert certain distractions in open space settings. For example, when a first grade class files by silently (from lunch, let's say), the class in session can largely be involved in smiling and waving at friends.

By the fifth grade the children are used to open-space buildings. One elementary school holds fifth grade town meetings on Friday. "Onions and roses" are handed out to kids and staff. New students are introduced--a less than obvious but very important function in a quickly growing district. Problems are aired. No complaints are registered from other grades about the noise or laughter emanating from these meetings.

The Elementary Faculty Handbook addresses the problem directly as one point in a list of "DON'TS."

> *Do not talk through noise. One of the most common mistakes made by teachers is that of competing with a "room full" of noisy students. At the very outset the teacher should make it clear that he will give everyone who has anything to say an opportunity, but that he expects the same consideration. Then, if he refuses to compete, if he will stop and wait for the offenders to give their attention, the habit of giving respect to the person speaking is soon established. If the teacher does compete, however, another kind of habit is formed; more people get into the competition, the volume of noise increases, and the control problem is immense.*

The matter of noise in an open-space school is a lively topic in the district. The chief complainants about the noise in elementary school are those who have not experienced it directly as a teacher. The adverse comments were quite rare from those who taught in open space. Later in this story we will note a shift in these attitudes in the junior high schools.

All in all, those in open space advocate it. (This is less true for junior high teachers). Self-contained classroom teachers advocate that arrangement. Neither marshal convincing arguments that it makes any discernible difference in what children learn about science, mathematics or social studies.

Elementary Science

Elementary teachers in River Acres believe formal science instruction is necessary in the early grades. I asked many what difference it would make if they delayed the formal teaching of science until junior high school. Nearly all felt that would be unwise. That children would not be prepared for junior high science was a commonly anticipated consequence of such a curricular exclusion. This is particularly noteworthy when one considers that almost none knew what was being taught in junior high school. Later a similar point will be made for the junior high teachers.

What's The Big Idea?

As was my wont in mathematics, I also asked teachers what science was or "What is the big idea?" Most of the elementary teachers' responses were brief and to one point: science is finding out about life through careful observation. A most holistic response was made by a district administrator:

> *Observation and relating that experience to what you are. That is what the [elementary] teacher has to find out: What the child has in his mind.*

In the elementary school with the "science shack" (to be described later), a primary teacher said:

> *Science is the little science building where more science got taught than in this whole huge building put together. Our schools are being built too large. Science is not a large group activity. It is small, for one person or a small group. The little building had more than the fine science aide; it had the right size for small children to do science.*

The only mention of difference in science achievement or interest for boys versus girls came from science team leaders who felt girls may use science as a "cop out to be cute with male teachers like they do with their daddies." Allow me to jump ahead in the story to observe here that there is little support for the notion that real differences exist for male versus female students in any grade in River Acres insofar as interest or ability in mathematics and science ability or learning are concerned. Important exceptions in high school advanced science courses will be noted. Science and social studies serve many masters in these elementary schools. For some they "humanize" the academic curriculum. For others large science classes permit teachers to slough off students for remediation in reading and arithmetic. For a very few, science is crucial in its own right.

Success

Two outstanding examples of elementary science teaching began five years ago when two science teacher aides started working in a temporary building ("shack"). Shacks are portable "temporary" units destined to permanently grace this district in the years ahead. One person is now a certified teacher in the district, the other now works principally in a non-science role. As a result, the instructional flow of the shack is currently at low tide. Vestiges of an earlier era are revealed in the shack: hognose snakes, a Japanese racing rat, beaver logs from New Mexico, plants in demijars, sharksteeth, morning doves, pigeons, rattlesnake skins, hutches, fossils, tanned hides and terraria. The aide, now working in reading instruction, spoke to me of interdependence, balance of nature, endangered species, food chains, ecology, pollution and the scientific method. She created "lend a pet" (taking animals home on a trial basis); "the great tree planting project" (1,500!); a "save the eagles" campaign; and told how they even managed to lose an armadillo. She still has a cat with two kittens, an

alligator out on loan, cacti and a fossil-plaster mold project underway in her "spare" time.

> *The only difference between boys and girls in science is snakes and worms and that doesn't last long. . . .*
>
> *Resource conservation begins with your own mind. For example, I believe it is important for them to learn first hand that tense children produce tense animals. The cat is disturbed, the guinea pigs, the doves. More squealing, defecating, biting. Kids see that, we talk about it. Environmental balance, interdependence, child rearing, communication of emotions, anxiety teaching. Lots to be learned there. The rabbits who eat their young when they have been held. Our work in the shack makes the [science] book worth reading for the kids.*
>
> *When a child asks how a bird stands on a wire, a more reasonable answer can be found from holding a bird and observing, than from any amount of verbal explanation by a teacher. I try not to give a child an answer. The question means curiosity and that means opportunity for learning--not for getting what's in me into him.*

The second aide who started the shack has become a science teacher at another elementary school. Her present science area has features that include a scorpion, tarantula, parakeet, spider, and an octopus on order. Eastern and Western hognose snakes are in place. The day I interviewed her she was running her two-times-a-week science activity afterschool group. The principal supports her in every way possible. (He was an art major.) Two boys were busily looking for the "lost" iguana in the 21'x9' science anteroom. These "Thursday kids" are a bit squeamish about reptiles, or unclean situations (animal pens). Ms. Rudolph is low key, patient. She feels redundancy is:

> *Very necessary. They'll forget much but re-learn it so much easier later. They might not fully appreciate Newton's Law now but I don't force it. Later they'll recognize having heard of it so it won't be a total shock. They may only recall that objects behave differently in outer space and on earth.*

She is starting to work out her own version of an integrated mathematics, science and writing approach to the curriculum. The principal is supportive of this. (He is the one who thought open space was "nuts" before he saw it.) The curriculum under design will integrate SAPA and STEM into the curriculum. There will be no science class per se. (She would have a science area.) "The way we teach children forces them to see all things as separate institutes; you spell in spelling, use taxonomies in science, measure in arithmetic, think about people in social studies. Where in school do we teach kids to get it all together?"

General Practice

The curriculum guide says "The goal of our [science] program is investigation and this requires activity on the part of the child." There are no Texas regulations on elementary school science content as there are for high school. There has been a state committee at work for several years. How "activity" and "investigation" get implemented range widely from teacher to teacher and school to school. For many of the elementary teachers one grade level team leader said it all:

> *Elementary science is an unnecessarily scary thing for teachers. The technical complexity is not that great. Teachers really do not need to know that much. It is just that we are not prepared to teach it, have bad memories of freshman biology in college, and get no in-service help to speak of.*

Another gave me a cryptic message:

Q. Tell me about your science curriculum in the primary grades.

A. Well, our rooms have water.

Science and social studies as a humanizing influence are seen in the comment of one second grade teacher:

Science is a child-centered activity in our school. It should be a place where the child finds out how things work for himself. It should be fun. Asking "why" is important and seeing "how" is essential. Letter grades really should not be given. I give a B if the child participates at all. In science we try to expose them all to the same concepts and don't ability group. It [and social studies] is the one academic place where we are all together.

A fourth-grade teacher described science teaching this way:

The schedule is arranged for large classes in science and social studies instruction. That frees up other teachers to work on math and reading. It makes sense because the reading problem is the biggest one we face in [teaching] science. So we have over eighty students in there. Now you really can't hold eighty at a time and we don't try to group them for instruction. Children have a chance to be with their agemates who they normally don't see in class in school. It's random assignment to stations and activities all the way. I think it is a good way to do it.

The role of the textbook is less clear in science than in mathematics. The curriculum guide was written with the text central to its organization.

Our curriculum in science is coordinated by the textbook. It is all there and we follow it. I assume it is coordinated: it better be! (Fifth grade teacher)

And a fourth grade teacher felt:

The texts and concepts in science kits don't fit. Too much teacher-do and children-watch! Open space aids this because we have huge groups in social studies and science. Too large for much besides demonstration.

And a third grade teacher:

The chapters in the science text are far too long. Children would love to have science early in the morning. Several experiments at once just cannot be done with elementary school children. Several things can be done, and most of it would be busy work like skill sheets, individual projects going to the library, reading from the text while one group does an experiment. But only one experiment.

For those who disvalue elementary school science teaching, one kindergarten teacher speaks:

We have two hours and forty-five minutes in our instructional day. Science takes time. [She teaches] a little science before the school's science fair each year. I'll let first grade do science.

Generally I don't follow the book. It is okay for the top group but it is dry. The concepts are there but it takes Ginny [the "shack" science aide] to bring it to real life. Reading about yeast does not equal making bread.

One science teacher observed that some concepts are too difficult for elementary school children.

> *We can get them to use words like "molecule structure, models and chemical substance" and all those good things but they just can't handle it. And our new science program emphasizes that in the second grade. I'd say 75% of them won't get the fifth grade universe science material; "wave and particle theory; and spectroscopic analysis of compounds; and continual motion of bodies in space!" Not a chance.*

The elementary school science teaching I observed was restricted to grade four and five pupils. They moved from one activity table to another following assignments posted at the station. In one room it was six stations with about ninety children and two teachers. One group worked in the resource center. In a second it was three groups with two teachers. Ditto pages from textbooks, commercial and teacher-made packets tell students what to do, how to do it. "Place the litmus paper in the jar filled with vinegar. Note any change in color." After students complete an activity they take a check-up exercise. A general observation of the use of packets in science teaching as well as mathematics and social studies in River Acres K-8 should be made here. Dismay and frustration were expressed by several teachers over the avalanche of paperwork associated with the use of these packets. Several teachers could not tell me who created them; "they were here when I got here."

The poor quality of the mimeographing of the packets was mentioned by parents at more than one elementary school. "My children are doing well, so that is not the nature of my complaint; but they are blurred, often grammatically improper, and just lists of things to do." Another parent saw the purpose of packets as being the "opportunity to do more packets. She finishes one, regurgitates it on a so-called test for the privilege of going on to the next packet. My land!"

At the junior high level parents were critical of several of the packets which they saw as "so much busywork." A particularly irate junior high teacher described her considerable efforts to revise the packets in social studies which resulted in their not being used by the department.

Several elementary teachers told me they were glad they did not have to teach science, because of the open-space arrangement. (Specialists do.) In two schools the science teachers volunteered to do the task. I recall one mistaking me for a college science teacher and asking, "Nothing personal, but why are all science and mathematics professors so blasé?"

The elementary science teachers I saw avoided answering children's questions. One confided after class, "I'm not going to answer the argument about hot-core or cold-core [earth's center]. The kids are going to dig out the facts. That's what science is, finding out the facts."

A particularly troublesome aspect of the science curriculum is what to do with the poor reader? One teacher observed that manipulanda are out of the question for a room full of eighty children (science is always large group instruction in the open-space school):

> *So we put these kiddos in large groups so we can have small groups in mathematics and reading and there is absolutely nothing at hand for the slower than average child in science. We need materials. The teachers are trying. The kids are trying. So it must be the materials.*

A notable curricular difference in the self-contained schools is their practice of having large language arts groups to enable them to have smaller groups in science and social studies.

A fifth-grade teacher of the bottom level children said:

Frankly we don't teach much science. Usually science is taught along with social studies and it is in a unit like "Dinosaurs" or "Transportation."

Elementary Science Interest

Several informants noted a general lessening of interest in science as children moved through the elementary grades.

First graders love science. It is exciting and different. By the time they get to junior high some are saying, "Oh no, not science!" When first and second graders get excited about science--magnets are fun you know--they squeal with delight. We somehow manage to take out that fun as we go along. I don't know how we do it.

Science in general has lost its appeal. The science fairs, so "big" in the sixties, have been reduced to a sometime thing for most schools. Several observed the "parents'" science fairs of the sixties were a mixed blessing. The fairs at once created parental interest in the science education and "terrific competition among the parents for recognition and prizes awarded to [their and] their children's entries."

Teachers gave broad hints at what "works" in teaching science to elementary age children.

The things that turn on third graders are things which they have seen or heard about but never really understood.

If something does not appear to the child to be related directly to his life then it better be amazing or fascinating. Teacher education is really short of giving us ideas that work.

More than anything else, children love experiments. Even watching me do one is better than reading. Doing them is best of course, but there is very little they can really do. Right now we are creating rust. When they read ferrous oxide it means little. But when they see it form, it sticks. This is where the equipment and space become crucial. Faces light up for activities, go blank for reading about science.

The things that work are not surprising. When children are interested, are active and involved, classes pass nicely.

One of the things that "works" is to avoid assigning reading in science. A similar observation was made by teachers in arithmetic and social studies in all elementary school grades. Reading, mathematics (and spelling) come first. Science and social studies come second in both teacher preparation time and actual teaching time. The principal reason for avoiding assignments in science is two-sided: the texts are too difficult in reading science materials.

I spoke with teachers who work with the lower-level science groups about "hands on" instruction to interest such students. One teacher not without wit replied: "Yes, but first we have to identify our hands." Later this teacher suggested that "hands on" science experiences were needed far more by the upper-level students than by the lower-level students. She was of the opinion that top-flight students could get verbal abstractions quickly without really "understanding it in their bones," which could come through laboratory work. (Presumably the lower-level students would not get the abstractions before, or after, the laboratory experiences.)

Elementary Mathematics

Mathematics teaching and learning can be said to be much like the children's rhyme, "When it is good it is very, very good and when it is bad it is horrid." When mathematics goes poorly in the later grades, especially with the lower levels, the question often raised is, "What are they doing down there?" What they are doing "down there," as I saw it, was what they were supposed to be doing according to the district curriculum guide, the teachers' objectives and what the teachers said they were doing. There are thirty instructional levels spread over the five elementary grades. Each level has skills and subskills spelled out in the curriculum guide that generally parallel the textbooks found in the classrooms. For example, in grade four, three of the sub-skills emphasized are:

Number Theory:	Finds common multiples, uses exponents
Fractions:	Adds fractions; subtracts fractions
Operations:	100 addition, subtraction and multiplication facts and 90 division facts by memory.

The textbooks in use often present more than one way to approach the solution of a problem. More particularly this is offered as help in teaching a skill. Teachers see this as confusing to the child. Children say it is confusing to them. "I don't get it. Which way is right? Do we have to do it both ways?" So the teachers select one way and teach it. Then the kids end up weak in mathematics skills according to the junior and senior high teachers.

To achieve individualization of work for low and high achievers in mathematics, teachers use lots of duplicating masters. On any given day one can observe most children in grades four and five working on "individual contracts" which are packets of prepared master dittoed sheets stressing specific arithmetic skills. Teachers recognize that children may do the contracts to finish them rather than to understand what is in it. "But what is the alternative?" they ask. "Mass group instruction," they answer.

My observations and conversations lead me to say they were teaching what they are supposed to. Not merely at the fourth grade, or at the elementary school; rather, the curriculum was what it is "advertised to be" from K-12. One teacher in her early twenties said a lot for the spirit and practice of mathematics teaching in River Acres when she said:

> *We are terribly old fashioned and I am proud of it. It is old fashioned and super to expect every first grader to have "rapid memory" of basic facts to ten. We also expect fast first graders to have rapid memory to twenty. You get what you expect in teaching and in life. When it gets down to it every teaching technique that works is an old fashioned one that involves understanding facts and remembering them quickly. The really able children and people are the ones who have the concepts under the rapid memory.*

Is speed in elementary mathematics important? Most feel it is and that flashcards and board work can help in this matter. A few question the importance of an emphasis on speed: "It is not how fast 7+8=15 can be given that the mathematics teacher should watch; it is how much 7+8=15 means."

There is no evidence or feeling that boys are more apt or interested in mathematics than are the girls in River Acres. There is some concern that grouping (levels) results in Black or Mexican-American children rarely being in the top groups. In general the achievement scores in mathematics have risen steadily for all elementary grades since 1970 and are at or above national grade level standards. Some attribute this to better teachers --most to better learners (due to in-migration).

A district administrator told me that mathematics teaching is in the planners' minds when their elementary schools are built: "We design elementary schools to deal with sixty kids in art, science, social studies and music so that reading and mathematics can have ten." But primary teachers feel the pressure coming from "above":

> *Our team feels in general that the buck gets passed back to us and the buck is one denomination: reading. We have to get the reading job done. Science, math and social studies can wait. But mathematics and reading go together pretty much. Twenty of twenty-five children are in the same block in reading and mathematics.*

And a few later elementary teachers have their doubts about what's going on "below."

> *I have just spent four weeks on one digit addition and I really represent this. [Block 4 lower level; there are four blocks and each has an upper and lower level.] What have they been doing for three years is what I want to know. [She had not taught primary.] Only block 1 is on grade level in mathematics.*

One teacher felt the many levels may confuse parents and perhaps go against what the parents expected:

> *The levels 1-18 that we developed in the past don't match what we are using now. The parents have to be confused by this. We'll get it worked out. For example, levels 1-6 mean completing the first grade. The parents who understand that don't like it. They don't remember school being like that. What they do want is more and more, earlier and earlier for their child.*

Not all are pleased with the recent district efforts to monitor instruction and achievement by having elementary teachers complete checklists on student mathematics skill learning. One open-space teacher exclaimed:

> *Filling out record sheets on each child is silly; I have to record that on March 30 Billy knows his facts from one to ten. So what! I'm going to check to see if he knows them anyway. If he doesn't, then what? Do I go to Mrs. Athens and ask [what happened last year]? If she says she will do her best to teach them that's good enough for me.*

A third grade teacher in self-contained classroom pointed and cried:

> *That sheet! [in math] No teacher needs a sheet to know whether a child can add 4+4. And we don't make any use of the date the child was checked as knowing 4+4.*

What's the Big Idea?

What is math? I asked scores of teachers this question and the answers generally were "logic" and "computation." In the course of their telling me about math, the topics of modern mathematics and back to the basics recurred. They said:

I never saw it [modern math] work. [At third grade.] It puts kids into junior high school math with expanded sentences and all without having the basic addition and subtraction facts down. We do talk with the first and second grade teachers about our children's weaknesses in basics. But we are all using the same text and following the same curriculum. Next year it will be better with the new books.

Six years ago we made a mistake and went too far in teaching abstractions. We had to; we had no choice. All the texts were modern in Texas. Worse, we had a 1-3 grade series and a different one for grades 4-5.

I was told that the reason the new math was brought into being was to satisfy a child's "natural curiosity." And I thought that was a ridiculous statement; because who's curious as to why 5+2=7.

I can tell in a second if a school has gone back to basics in the second grade: look for the flashcards.

Modern mathematics? I dislike it. Too many ways befuddle young child. I skip what I think is useless and use what I think is pertinent. I really think Addison Wesley shows three ways when one will do. The brass tacks are learning addition and subtraction. That's it.

I dislike our book, not enough drill, it's modern math. We adopted a new book. I don't know its title but it has more drill, more basics and I'll like it.

Some work has begun on metrics but the progress is not clear.

It [the new text] has metrics. But confusing. Could be an in-service opportunity for teachers on this. (A second grade teacher)

Teachers feel some expectations for elementary school mathematics may be too high:

Understand place value to millions for a third grader?! [Continues reading from the district Mathematics Guide] . . . "develop skill in subtraction with and without regrouping through hundreds place. Understand inverse relation between addition and subtraction." Half the parent-teacher council couldn't do what we are expected to have our little third graders doing by April.

A secretary in the board office showed considerable interest in the questions I was asking teachers and students. I asked her what she thought mathematics was. Her reply stuck with me through and long after the study's completion:

I don't know how to say what mathematics is but I can tell you I learned to hate it in Miss Adams' second grade.

Mathematics Texts and Expectations

Reading is king of the elementary curriculum. Teachers agree that mathematics is the next most important thing to learn in elementary school. The sixteen reading levels in the first five grades are based on two or three basal reading series and considerable machines, labs, games, kits and a variety of other supplementary materials. The importance of reading instruction is manifest in attitude as well:

If I wait until one o'clock to teach my first graders reading, I have waited too long. In some cases it [learning] is all over by ten o'clock.

But poor readers often have trouble with mathematics:

We just do not have curriculum for the child who has difficulty in arithmetic. What we do is slow down, take smaller bites, do it more often and pray. Often the child will have reading difficulty, too. Then that child is really in trouble.

Teachers did not call for research or for evaluation of instructional materials or the curriculum. They want help, now. They have three widespread concerns. My notes contain thirty-seven separate pleas (not all elementary) for materials, procedures, aides, or supervision for slow children in mathematics. The harshest self-criticism made was in the mathematics instruction of students in the lower levels. An elementary school counselor observed:

Slow children are confused by the missing number equations. I've seen five years of them bewildered by 3+?=5. They need to manipulate concretely for a very, very long time before memorizing the 3+2 fact.

Nine teachers in ten follow the mathematics textbook, "sorta." A first-grade teacher finds her book:

. . . skipping around from concept to concept (four teachers concur). The visual clues in the text do not work. They are cute "stylized New York" but don't mean a thing to Texas kids.

Another said, "They [text diagrams] are pretty, but the kids don't catch on."

They give two pages in subtraction before going to mixed addition and subtraction problems. For the low group we need at least two weeks, not two pages, on subtraction before going on to mixed problems.

Listen to elementary teachers speak to book publishers!

In the context presented, the bar graphs cannot be used . . .

The book begins with the assumption that shapes are known to kids. Poor assumption. Many first graders never get their shapes and names down . . .

The book is inconsistent in format. Moves from left to right then from top to bottom then reverses within a very few pages.

They take up grouping and place value at the very beginning of the book and that's too abstract a way to begin for six year olds.

A second-grade teacher expressed other textual difficulties:

> *. . . Sequencing is poor: from addition to multiplication to geometry back to multiplication to fractions to multiplications to I don't know what.*

The crunch comes in third grade:

> *Third graders roll along until they hit inverse relations. Boy, when you hit subtraction the world comes to an end! 3+4=7 okay, 4+3=7 okay, but 7-3=3? Lord!*

Another third-grade teacher finds:

> *This book has too much esoteric garbage in it. It is simply too hard. The geometry is silly [to try and teach] even for our best third graders. So we all skip it.*

Still another third-grade teacher comments on a (different) math text:

> *The textbook says to show method A for regrouping in addition and then to switch to method B. Every teacher in the school knows this confuses kids. So we don't show kids method A.*

Fourth-and fifth-grade teachers describe yet another publisher's series:

> *The text doesn't flow from one page to the next. The principles of multiplication, addition, division and subtraction are unrelated. For example:*
>
> *5x3=(2x3)+(3x3)*
>
> *15= 6 + 9*
>
> *Why should the kids learn this? All the teachers here would agree with me. It's really a stinker. The text assumes that if a kid can reason through one problem the kid can do them all. This is true only for the above average kid.*

Almost to the teacher there is a sigh of relief that the "modern math god" is dead.

> *We are fortunate not to have gone way out for the new math. We have stuck to the basics throughout it all and the results that are coming in show we were right.*

Boredom

Student attitude toward mathematics is a most frequently heard topic (after learning the basic operations) in the dialogue on elementary school math instruction. To counteract student and personal boredom, teachers create a variety of games, ditto masters, puzzles, approaches.

> *Doesn't have to be dull. Everybody likes to talk about themselves; to work on a problem that is their own problem. So I always use my kids' names in the problems and make the problems something that relates to their lives in school or out. (Grade 2)*

> *There is no way on God's green earth to teach mathematics without a lot of drill. It could, can, should be fun. (Grade 3)*

> *We adopted the [new] series a year and a half ago. Where is it? It has games, hints, ideas, activities that we need to spice it up. (Grade 1)*

Fifth graders are harder to motivate than are first graders. By the time they are in the fifth grade they have had the whole bit. They get the same things they didn't understand the first times back again and for the first time honest to goodness boredom is felt about mathematics--even about science. (She was a team leader at Meadows fifth grade.) Then there is the universal of fifth grade spring for some of the girls. Whooop! Tears, friends, menstrual cycles, how do I look?

Another teacher (in her ninth year of teaching) spoke for several when she sharply distinguished high-achieving math students from the boredom of others:

You might as well forget about teaching conceptual mathematics to 75% of the children in elementary school. The upper level children like it. The rest are not only bored--they hate it!

Another fifth-grade math teacher linked the elementary school experience to what she thought was coming in junior high:

When [lower level] kids in the fifth grade get to junior high school they had better be ready for boredom. It hasn't changed much from when I was there. At the end of the fifth we identify skills and deficiencies in skills. Generally what we hear from the two junior high schools [one-fourth go to SL and three-fourths to MC] is, "We don't have time for all that, just give us the level." When in the sixth grade that means the lowest level gets the lowest level book and no deficiency skill program is followed to help them. It's smack into the book.

What is coming in the junior high for eight students in ten is a lot more of the same. For the very able it will be pre-algebra; but that is getting ahead of my story.

Elementary Social Studies

I paid far less attention to elementary social studies than I did to science and mathematics. I believe the teachers do, too. My question as to what the "big idea" was in social studies brought little beyond "history" and "geography." A fourth-grade teacher offered a comment on the lower priority assigned social studies: "In the self-contained classroom teachers set their personal priorities and science and social studies turn out to be step-children."

While some teachers find social studies teaching most rewarding with the most able children, I found none who enjoyed social studies teaching with the least able.

Block one kids are really interested in concepts like continental drift. That concept is too far above the average block two's head. So the difference is really a big one. It is not just a matter of a <u>little</u> difference.

The book is filled with irrelevancies. I have to dig to relate it to my children's lives. The science book, on the other hand, is easily related to their lives. They need a lot of help with observation. We are creating a society of non-observant children.

In the open-space setting social studies seems to moderate the effects of grouping in other subjects.

I feel science and social studies gives us the one place in academic schooling when the lowest kid can really participate in class. There are so many things that can be done that are fun for children of all ages, abilities. It is vital that we keep science and social studies informal in a school that homogeneously groups in reading and mathematics.

A social studies teacher pointed to the state accreditation principles and standards and commented that, "If the geography doesn't get better soon around here somebody might make an issue out of this." She pointed to standard 4 under principle XI which treats the matter of total school or departmental quality: "No segment of the school is overcrowded or underequipped in order to maintain the program of another segment." She warned:

We have large social studies classes to let them have small classes in reading and math. We aren't getting them taught any geography this way. It's awful what they say in high school about it and they are right.

But she was a rare bird in the elementary social studies aviary. The curriculum could disappear tomorrow and no junior high school effects would be noted.

An assistant principal has his personal set of indicators about the status of the elementary social studies and science curricula.

A "dead give away" to our unsure attitude toward social studies and often science--this is an attitude, not necessarily whether we <u>are</u> competent or not--is the number of films or film strips we use and show in science and social studies. Too many teachers show films and call it science. Take the heart of the elementary curriculum: reading, spelling, writing and arithmetic. How many films do we show there. Very few indeed. We know what we are doing there. It is not that we don't use them . . . but judiciously. In science, we are in desperate need of help so we turn to films. The printed materials will only get us in deeper trouble with the weak-skilled child in reading. So we turn to the non-print. If we had instructional television in the building you would have proof positive, I believe. The Mr. Rodgers, and National Geographic specials would be on all the time. But we can do as well or better than Electric Company in teaching reading. A lot of teachers in the elementary school are just plain afraid of science. And a lot of teachers in the junior high school that aren't should be.

Social studies is felt to be a filler in the curriculum by one primary teacher:

If I were to follow the curriculum guide for the primary I would teach Minneapolis on Tuesday and steam on Thursday. The kids just cannot jump from Minneapolis to steam at seven years of age and make sense out of it. (Chapter two in second grade social studies curriculum uses Minneapolis to illustrate the growth of communities.)

A second grade teacher is trying to emphasize personal knowledge in her social studies teaching, to get it "out of the doldrums."

She has tried "My Name" first unit. Fun. When someone used your name and you did not know he knew it, how did you feel?

Draw a picture of yourself today. When you grow up. Guess who this picture is (teacher shows class self portraits). Teacher said she never did any real social studies before this.

It's easier to plan a social studies unit than to plan a science unit. Children are really interested in science, but what they can do and learn something from is hard to plan.

For the most part elementary social studies is taught without regard for what is coming in the year(s) ahead or what has gone on before. It is not seen to be "cumulative" as mathematics is seen to be. The senior high social studies teachers will comment on this. In general, elementary school social studies is a low-problem-no-trouble aspect of the curriculum.

Curriculum Problems

There is apparently no one in the district with the job or ample time to explore curricular problems at the depth and for the duration required to understand what may or may not be happening in the science, math or social science curriculum. From time to time in my study I found most perplexing information. For example one day I pursued with the counselor an observation made earlier by a math teacher. The observation was that over several years a sizable group of children had first, a markedly different achievement in math and reading; and second, that the more able students were better in math than in reading and less able students were better in reading than in math.

We took an hour to pull reading scores of two arbitrary levels of students at one arbitrary grade just to see what the achievement test scores were. If the student had scores greater than one year apart we called it a difference. If it was a year or less we called it no difference. Here is what we found:

	Math-Hi Read-Lo	Read-Hi Math-Lo	Same
Level 2	15	2	7
Level 6	2	10	8

Now what can that mean? And is it true for other grades. For other levels. Is it just the test being used to measure math? Does it have something to do with teaching math? Is it true only at that school? Probably no one knows. Even if one wished to explore such matters, the time required and personnel needed to explore curriculum issues are not in River Acres.

The Great Mystery

There is a specter residing in the minds of River Acres' teachers which I called the Great Mystery. Although I love a mystery, I never initiated the topic. In its mildest form it merely can be called "forgetting." I think it is a crucial issue in teaching. Let's begin with elementary science.

Today we did Isaac Newton and gravity. It was fun and the children loved it. By the end of the day I felt that the lowest group--most of them had a grasp of gravity. They might forget it by tomorrow. But we'll review it for a couple days and at least they know there is something holding you to the end of the earth.

Now a math teacher speaks:

> *Except for the "block 1s" (35 of 140 third graders) all third graders know one thing perfect in math one day and the next it is gone . . . I mean GONE. (She has all the block 2s--average kids). It is a week to week, year to year experience. I have had children for three years in a row. Knows his facts up to 19 in addition beautifully in May, comes back in September and he's forgotten them. I mean zero retention. Now what I want you to know is that ALL the kids except block 1, and some of them too, have this mysterious "forgetting disease." Last week I had the "2s" borrowing and carrying and I was so happy and we were all dancing. After Thanksgiving they came back and acted like they had never heard the word "borrow." Borrow!? Teachers live with this. They see it every day and get used to it, so we don't talk about it. But it's there teaching math; day to day.*

A fourth-grade teacher discussed the mystery in the context of her concern for the amount and complexity of mathematical information and skill being "pushed downward in the curriculum":

> *I taught the basic addition facts in the first grade to these very same children. I have complete confidence in the [mathematics] teaching of my friends here in the second and third grades. I know they did it. And we use all available manipulative materials, counters, popsicle sticks, filmstrips, flashcards, you know. Now I have the same little people I had three years ago. The mathematical understanding is still there, but the proficiency is not. Summer [vacation] forgetting hits them every year. I can tell you they had it to 18 [the basic addition, subtraction facts, no carrying, borrowing]. They lose it, find it, lose it. Maybe none of the 18 is really a part of your system, a part of you. It's too-much-too-early maybe. Number readings is greatly overemphasized in kindergarten. We take pride in teaching more, faster, earlier. Teachers [first grade] will say, "I had my top group in second grade math in February." We really don't know what difference that makes.*

Another mystery story had several tellers. This one is analagous to the good and bad years for wine with the school reasons not being so obvious. An administrator tells us the first story:

> *The fifth grade class at X has a history of a total class of children. Last year we had a responsible group but far less responsive than this year's. I am thinking about both groups during November and December. A few years ago we had the most immature and sweetest group I can ever recall. What makes that? The kindergarten teachers say we have a bunch of holy terrors coming. I didn't believe it until I saw it.*

The River Acres teachers and staff would welcome assistance in analyzing and combating these problems in the teaching and learning of mathematics. It is a growing problem in the minds of some. In fact, the overall difficulties in teaching mathematics to the 50% of the students below average may be increasing.

> *The more able students are getting more able and the less able, less able. It is clear that in mathematics that those who are "getting it" are getting more of it, and faster.*

Help Wanted by Elementary Teachers

Several suggestions for welcomed help were offered by elementary teachers. The most prevalent, noted earlier, was a plea for help with teaching mathematics to children who have difficulty in learning the basic facts. Others call for help in teaching the metric system.

Dozens of elementary teachers, particularly in the fourth and fifth grades, want to meet with their high school counterparts in social studies, science and mathematics to show them what they are doing and to find out what their children are heading for. For example, they want to find out why children who are "sailing past fifth grade science and math" should not be given sixth grade materials. They are puzzled by reports that the boys are more outgoing in junior high and the girls shy. Is it because there are more male teachers? Because the organization suits one sex better?

They feel that cross-grade meetings would help junior high school teachers see what they are up against. An experienced third-grade teacher now teaching first grade for the first time was:

> *. . . amazed at how small these children are. You need patience beyond belief. When I taught third grade I really could not understand why more than one child in ten was not reading at grade level when they came to me. Now I expect 50% to reach grade level if I am lucky. I think 50% is a reasonable expectation in mathematics, however. Kids don't come to school knowing how to work in a group for instruction. It's so obvious, but I thought they did somehow. They have to learn to stay in line, stay in their seat, take turns, not talk when others are. There is very little a first-grader can do by himself [that helps in group instruction].*

Another first grade teacher said it all when she said she doubted that junior high teachers know that:

> *When I say "Put your heads down on your desk," it literally means absolutely nothing to almost all my class when we begin the year. That's how far they have to come.*

The staff of the elementary school that exchanges grades one day a year were most positive about that experience. Indeed, it has changed careers, initiated discussion and made everyone closer in their feelings toward one another.

A principal called for in-service workshops on the differences between elementary and junior high schools, so "we can really talk with one another for a change."

> *We treat them like children in the fifth and then after three summer months they become "students." Most elementary school teachers think they are there to help children with their learning mathematics and most junior high school teachers think they are there to impart mathematics to students who want it. Elementary school level three kids get taught where they are, whereas junior high school level three kids get taught the same as level two, only slower. What this ends up as is moving from slow achievement in the fifth grade to total failure in the sixth. The junior high school will say it is because they are having a tough time to adjust to junior high school. I say they aren't taught anymore. It's either them or us--one of us has to change.*

Not one member of the entire elementary Lincoln faculty knew what the junior high science curriculum or instruction contained or emphasized. Same thing for social studies. Same for math except that fifth-grade teachers knew about sixth grade pre-algebra classes. This meant they identified their "best" math students for that class; that's all. They all said they would like to visit to learn more about junior high school.

A former high school science teacher who now serves as a district administrator believes part of the cross-grade communication difficulties would be eliminated by viewing the junior high school as its name implies; i.e., a junior version of high school.

> *These grades would be better served by an interdisciplinary approach. It is a junior high school. We do not have the middle school concept in this district. State regulations say we can do junior high school any way we want. We could fuse English and reading/writing/spelling, which now are separate with unnecessary duplication. Social studies could be fused with English, too. This would be an easing of the K-5 to [grades] 6-8 transition for students who are neither fish nor fowl the way it is now.*

A comment on the real world of elementary classroom teaching seems in order here. When I interviewed this teacher in the course of a part of that interview I noted the decisions she made that I could observe. Thirteen decisions in ten minutes; she reacted to the following:

> *"What color t-shirt should I wear?" "I don't understand this part." "What page are we on?" "Can I use the flashcards?" "I can't do 16 take away 8." "My eye hurts!" "Billy is cheating." "What does this word say?" "What does this mean?" "Billy is still cheating!" "Do we need our boxes?" "Some people didn't push in their chairs." "Is this good work?"*

For those who regard the task of the elementary school teacher as less difficult than that of the secondary teacher, I offer the following from a secondary science teacher:

> *When I was single I could teach elementary school. I could devote my total self to it. And I did. I planned nights for individual children. Honestly, now that I have a family I can't. And it's impossible to do it for 175 anyway. So to make a long story short, I'm not in elementary anymore. Most elementary teachers can't do that because they don't have enough hours in science for certification.*

The elementary schools of River Acres are pleased with what they are achieving with their children. Texas poet Ruth Roberts did not intend her poem to speak directly to that sense of pride, but I found it apt.

INSIDE OUT

I watched her safely to the door
Then, job over, I relaxed and smiled.
But what, my (classic) still, small voice
    of (historic) conscience/guilt asked,
    if there are devils within?
Those? My answer, in a newfound
    tone of reason,
    strong and clear:
She'll have to deal with those herself.

Ruth Roberts

THE JUNIOR HIGH SCHOOLS: GRADES SIX, SEVEN, EIGHT

The report is now divided to present views of Westland and Eastland Junior High Schools. Both are open space and both were opened in the past two years.

If the reader has read the descriptions of the use of open space for team teaching in the elementary schools of River Acres, a word is in order about open space in these junior high schools. Labels are convenient and tricky. The twenty-mule Borax team had eighteen mules and two lead horses. Open space in the junior high and elementary schools are the same in name only.

Both junior high schools have nearly identical instructional curricula, the same procedure for assigning students to three instructional levels, with minor variations, similar materials and building architecture in the science, mathematics and social studies. Team teaching is infrequent in both and neither individualizes instruction in the three curricula. But, I felt the newness of Eastland Junior High (opened three months), its size (500 additional students in approximately the same basic plant), and unique themes which appeared in one and not the other suggested the advisability of a separate presentation.

Westland (WJHS) and Eastland (EJHS) offer the same curricula in science, mathematics and social studies insofar as courses are concerned. Neither does anything special for its Mexican-American or Black students insofar as staff recruitment is concerned. They do provide a federally funded remedial reading program. As one faculty put it:

> *The problems the Latins have are in English, not Spanish. Arithmetic is the same in both languages and they must learn English or they'll never cut it in Central High.*

Because of its minority student proportions, EJHS is recognized by the National Student Defense Fund as a loan-approved school for college graduates to teach in. This means a fifteen percent reduction in the loans they took out while in college. Westland Junior High School is not so classified.

What is a junior high school? Some say it is a holding area until puberty is in full swing. Others regard it as a prep school for Central High School. I heard senior high teachers say that WJHS and EJHS teachers do not challenge students enough in math and science--especially math. It is not a matter of misinformation or a lack of communication as some would assert. The senior high school science faculty use a different stick to measure educational progress. They judge a junior high program that has been called "excellent" as being "thin in content" or "low in expectations." They have different standards. They will speak for themselves presently.

Both Eastland and Westland faculties have teachers who, like their elementary colleagues, are concerned about the increasing difficulty of the total curriculum in River Acres.

> *Earlier and earlier we expect more and more. Where will it end? We pay for it earlier and earlier, too. Scandinavians do not start their children until age eight. Their literacy rate is better than ours. In two years their children are caught up with their European counterparts.*

In both schools the three curricular areas treated in this study are presented separately and emphasized equally. With only the rarest exception is an attempt made to fuse, integrate or in any way relate the mathematics content with science or the social studies.

For example, a department head in one of these schools will not tolerate any discussion of coursework other than that taught in his subject. It is not so much preventing the crossing of subject lines that characterizes Eastland and Westland as it is expecting that the courses ought to be kept separate as they are in high school.

Westland Junior High School

Clean, carpeted, orderly, open space, good lighting, friendly-but-tough principal sets the tone.

So ran my notes from the first, quick visit to the school. They represent fragmented impressions that still seemed about right three months later. Before long I started to see the mathematics teachers working with their calculators in their areas, grading, proctoring examinations; the science teachers going to the electronic test scoring machine. I started to hear the noise of instruction coming through the noise of my initial confusion. The noise level (quite reasonable for 175 kids and 7 adults in a mathematics area) is, nonetheless, terrific. Teachers are literally shouting their lectures, directions, questions at kids. (Not on disciplinary--but on instructional matters.)

Kids in all levels of science and social studies are "dressed up." For example, in a class of 3s (bottom) in science the last period of the day, I saw ten girls with hose and six with pant suits. The boys, less obviously "dressed," nonetheless had on expensive boots, Adidas track shoes, Southwest jewelry and other accouterments that complimented the girls' attire. Teachers say the richer kids from two of the more affluent feeder elementary schools get along better with students fed to the junior high schools from poorer neighborhoods than they do with other affluent kids. I observed no social-class tensions in these schools during my work in them.

Westland had about 1,000 students at the time of my visit and had been open for a little over a year. Its principal, an enormously successful football coach in years gone by, was enthusiastic about the study. He runs a tight ship with a heavy emphasis on humor, clear expectations for student conduct, and complete delegation of instructional authority to the three department heads in science, mathematics and social studies. Simply put, he views the world as imperfect but reminds his faculty and students that we are all lifetime members. "So let's quit complaining and go do all those good things."

Westland Junior High School Science

The junior high science curriculum, sixth-grade general science, seventh-grade life and eighth-grade earth, does not build on the elementary science curriculum in either junior high school. Teachers do not assume that students have certain scientific understandings, or have laboratory skills, or come with a common curricular experience from the River Acres elementary schools. Nor do they fault the elementary schools. Rather, it is not expected to be otherwise. In fact, the junior high science teachers know little about the elementary science curriculum.

State accreditation standards account for several of the ways we do things here. While elementary school is not detailed by the state, junior high school science must offer three quarters of science which must include earth and life. (Not specified which one is two quarters.)

RAISD exceeds those standards by offering one year of physical science in the sixth, one year of life science in the seventh, and one year of earth science in the eighth. (Evidence that they take science instruction seriously.)

The feeling that science is as important as any other subject is widespread in both junior highs. This was not so in the elementary school where reading and mathematics were "it." The difficulty many students have with reading and mathematics made science "less basic" in the eyes of one science teacher--but she was the one exception.

I guess this isn't science, but the minimum [basic] should include accepting responsibility for themselves in and out of school. That could serve as the bridge between school content and the real world out there. We all want science to be a good preparation for all the kids' lives. Science will be more likely used in life if personal responsibility is accepted.

Open Space

Open space is regarded as a mixed blessing at best by the junior high school science faculty at Westland. They regard it as a slight advantage for one small class (fifteen) of below average students, but as "impossible" for another ("the zoo"). Most teachers feel open space moderately distracts their average students and is of no importance insofar as teaching science to the top group. One veteran teacher saw the open-space noise problem as, "A teacher, not a student, problem. The kids don't care one way or the other." I observed one teacher on two separate days managing to achieve a sense of intimacy with her group by bringing them close together. She was exceptional; I never saw students seated on the carpeted floor.

A veteran teacher detailed some of the shortcomings of open space as he had experienced them.

We have the equipment and the supplies. We are blessed. Beautiful structures, these buildings. Now I'm going to tell you something that sounds foolish: in all this open space we have no space. We have no quiet space; no small space, no diversified instructional space.

What's The Big Idea?

There is no issue as to what constitutes science at WJHS. Faculty point to the topical headings of the Guide or the chapter titles of the text.

There is little faculty enthusiasm for teaching "scientific inquiry" or for "teaching inquiry by the scientific method." Further, there is the prevailing view that, "Those who promote inquiry over facts and concepts are hurting most students. Only the advanced students can benefit from that."

The Curriculum

A decade ago in River Acres the junior high science curriculum was in the hands of one man. He used early versions of NSF earth science laboratory materials. He had to

re-write his own version because mathematics was way beyond most of his students; too hard for the students and the teachers. This was especially true of meteorology.

Sizable portions of teachers in NSF institutes in meteorology were hopelessly lost in the mathematics of meteorology. Imagine what the teachers felt who tried to use the materials who never attended NSF upgrading institutes!? It's embarrassing for a teacher to be in that position.

But that was a decade ago. He has since retired and so has much of the curriculum he invented. Current curriculum development is of less certain origin.

I don't know who it is but someone in this district wants everyone to be at the same place at the same time.

The science curriculum, including a new Guide, is not seen as troublesome or in need of change by most of the staff. The exception (of course) existed.

A hodge-podge. The sequence is without justification. It does not proceed on a knowledge development basis and has questionable redundance: biomes, biomes, biomes. Life science is too varied and complex to be wasting kids' time.

The place, time and difficulty of teaching physical science in the secondary school is an issue in River Acres. The aforementioned experiment involved these questions. This year it is in the sixth and ninth grades. The difficulty lies in part with staff training. It takes considerable preparation time and "there are no good physical science texts for grades six, seven, and eight," according to many of the teachers. Teachers feel they do not have the time and in some cases the talent to do all the things the curriculum (text) seems to call for. The library and resource center are used occasionally by the staff--almost never by the students in science.

Students are often unenthusiastic about the earth science curriculum, say teachers. (Students confirmed that in an interview.)

Some children feel that this is not science. They associate science with plants and animals in the elementary school. It is no fun; it is boring, they will say. Mostly book work and facts and memorizing things. They are welcome to the dessert, but they've got to eat their oatmeal first.

Two items that did not prove to be of importance were team teaching and standardized tests. In science class on occasion a teacher replaces another as a lecturer to relieve student (and perhaps faculty) boredom. Cooperative team teaching is not used. The district's tests are not used by any of the faculty to plan or conduct instruction in science. The purpose they serve is to enable a counselor to place students in science instructional levels.

A year ago an experiment was tried--earth, life and physical sciences were taught by each faculty member at each of the three grades at all the levels (there were four then). It was discarded this year, being viewed as a chaotic failure by nearly all the faculty. Its intent was to add coherence to the faculty's understanding and implementation of the curriculum. Its effect was to expose their shortcomings and limit their strengths. (So much for innovation.) The faculty voted overwhelmingly to discontinue it. Two teachers told me that the experience of their children influenced that decision and many of the others they make in education. During the course of this study I must have heard a dozen teachers cite their own children's experience as the justification for the actions they took or the views they held as educators.

Instructional Levels

Although teachers claim the average student is at grade level (as do their counterparts at Eastland) they feel deeply about their instructional ineffectiveness for poor and many average students. It has nothing to do with science per se.

I have no earthly idea what they have had when I get them in the Fall [sixth grade]. The key to it all is placement. When we place 'em in the right level things go pretty well. [The counselors do most of the placing of the students initially.] Level one really hums, level three is good for individualization. Level two is a wide mixture. They are so diverse. They could be 1s or they could be another zoo.

The "zoo" reference is to a particular group of level three students that exasperates each teacher that works with them. The manner in which students' achievement is measured by teacher-made tests varies systematically from level to level. Level one can mean short written answers, can also be longer, more complex; for level two it is multiple choice or fill in the blank; and for level three it is always multiple choice with a narrow range of facts being tested, or select the answer with the aid of their "note fact-sheet" provided by the teacher for the text. Besides "the zoo," the level three students are described variously as "sullen and partially cowed"; as having "language problems"; as students who "can't read, write"; or who "don't give a hoot." Consensus has it that open space and level three don't mix.

One teacher saw some level three students as being " . . . somewhat ripped off by the system. River Acres fails a few who are very slow, but who are okay really." She felt these students could and did understand physical science concepts but read and wrote so slowly that they could not keep up and always did poorly on tests.

The core content of science instruction is similar across the three levels. The "ones" get it all, and more. They can volunteer to be assistants to wash equipment, set up demonstrations and are allowed to use non-chemical, non-flammable equipment. "Top group competition is fierce," said one teacher in my exit interview.

We need a low reading curriculum for the low 3s in science. I take level two material and condense it for the 3s. They just don't care or they are LD kids. Some just can't work in a large classroom. So I cut out the details and just give them basic understanding, orally. Nothing in depth is possible. You can't plan for a level three class in science. [Competition does not work.] Just begin by talking and then move on.

When science teachers work with the top-level students they are prepared and so are the students. What neither are prepared for are the questions spontaneously generated during such lessons, one of which follows in excerpted form.

Light refraction. Mr. Parker is ready shortly after the period begins. He has a projection of light refracted through a prism. The colors on the projection screen have been labeled and he begins:

"Ok now, when we talk about refraction what do we mean? I mean what is the difference between refraction and reflection, Nan?"

"Reflection is light bounced off and refraction is light redirected through something. Like that thing [someone says 'prism'] there."

"Ok good, now when we see light refracted as we can now we know that it is what . . . is always there and the colors we see are always there--even when we cannot see them as we can with the aid of the prism. Any questions about that before we go on? This is very important that we have that in mind." (No questions; class is attentive.)

"When light is refracted as Nan said, it gets broken up revealing its colors. After a rain storm you sometimes can look up and see what?"

"A rainbow."

"Right, a rainbow. And what is a rainbow? Right, refracted light."

"Is it reflected too?" (asks a boy).

"Yes."

"Why are there only three colors in a rainbow?" (asks a girl).

"Ok, let's look at the chart. (A long explanation ensues about the spectrum, what lengths of rays are perceptible, how these are the only ones that could appear to be there.) I know that is hard to understand, but I hope it helped you. Did it?"

(Girl smiles and nods.)

"Mr. Parker, why does it hang together?"

"Why does <u>what</u> hang together?"

"A rainbow. I mean why don't we see a whole bunch of three-color spots in the sky instead of a band?"

"That's hard to explain. You just don't know enough yet to explain that. But keep thinking. That is a good question."

(Same boy continues) "The one that really <u>gets</u> me is why does it [rainbow] . . . " (He then moves his hand in an arc simulating the shape of a rainbow on the horizon.)

"It forms an arc because that's the only shape it could take optically. I think we had better get back to the prismatic refraction."

Mr. Parker told me he "just hates it" when he cannot answer the students' questions. He feels that no matter how much he prepares, their questions will reveal his inadequacy. "So I just keep up with yesterday and let tomorrow take care of itself. I wasn't trained in physical science but I believe it is better to let students ask questions than to try to bull it through."

The thing I shall remember longest about the science curriculum at WJHS is teachers rushing to and from their instructional area to make phone calls to parents. Every morning, afternoon, lunch period, preparation period and between periods. Calls, calls, calls. If activity reflects purpose and the most activity represents the highest purpose, I know what is foremost in the minds of the science teachers: informing parents about their children's progress--or more likely, the lack of it.

Westland Junior High School Mathematics

Westland mathematics instruction is organized around two textbooks and three instructional levels. Two of the teachers made minor criticism of aspects of a text. There is no team teaching and the open space is divided into separate classroom areas.

The counselor pointed with pride to a group of about fifty students whose scores were at or exceeded the 90th centile on a national achievement test. The distribution in a grade is roughly 65 in the top "accelerated" group, 240 in the "average" group and 65 in the lower "basic skills" group.

The big story here and elsewhere in River Acres is the low achiever in mathematics. A seventh-grade teacher has little hope for a "breakthrough" in helping teachers work with the slow math students.

> *The largest problem a teacher has with level 3s is thinking they can learn the same thing in math as level 1s. Their conceptual abilities are limited. They can't get deep understanding no matter how many times they do something, how cleverly we present the material. They are going to have to be able to multiply and divide when they get out there. What I am personally concerned with is that they have the skills they need for use. I will present some conceptual groundwork. In place value we will go through ones, tens, hundreds, I don't just ignore it. I simply won't spend all week getting ready to teach the skills, because I have found this: you can go through it one day and they can work out this long expanded notation and the next day you can come back in and represent the identical same page and they still would not be able to figure out what the parentheses and pluses across the page mean. There is not much difference in our opinions as teachers about this business of working with level 3s.*

More often than not the child in level three is Mexican-American or Black. The kids who can't or don't get it are the bane of the mathematics teachers' existence. Mrs. Harding said:

> *Slow kids are unnecessarily penalized in math. Slow in their actions but solid in their math is bad news. They get hurt. We can't increase their speed by snapping our fingers. The mountain no one, I mean no one can climb is how do we get the needed drill without boredom? That is the question in junior high school mathematics. We need an activity workbook filled with practice ideas for each grade.*

Her view is not with the majority, which is more one of seeing the kids as not trying.

> *If I had to put it into a nutshell I'd say these kids are lazy. They have the ability, many of them. I don't know when it begins [laziness] or how it develops. (All three agree.)*

In an unusually redundant vein, I offer an extract from an interview with three other math teachers:

> *We shouldn't call it ability grouping. It is performance grouping. The reason most of the kids are in three is because they are lazy. We all know we use but a fraction of our ability, you know.*

An algebra teacher saw it as an interaction of disinterest and unnecessary confusion.

> *Here's the problem in a nutshell: we are teaching them why we do what we are doing and fundamentally most of them are interested. The thing they never get in the first five grades is one method that works. So, I teach old division, not what the book says about the new mathematics.*

Others echoed the complaint pointing to the textbook as a primary source of their problems. One sixth-grade teacher has simply quit using the textbook because:

> *It confuses the kids. Long addition problems involving expanded notation which confuses the kids more in the explanation--the kids spend considerable time and can't figure out what they want and never do get to the skills. Now I have an individual card on each kid. Diagnostic tests to see where each one is and practice on the four basic skills. I am using the rote method pretty much because they have found out that with a three level you can spend all hour trying to get them to understand [and they can't].*

The district has sought to regularize its instruction in mathematics through the development of a curriculum Guide. It has had department heads and select teachers working on behavioral objectives which correspond with the content of the texts. To these are added resource materials owned by the district or available through an inter-district cooperative. One teacher more strident in tone than most said it for the faculty when she discussed behavioral objectives as "minor perturbations" in the big picture.

Standard practice that is widely averred by junior high math teachers as successful is repetition. I saw it in use daily over all grades--but less so at the upper (zero and one) levels. One articulate teacher who was acclaimed as very successful says it this way:

> *The key to mathematics teaching and learning. In fact it's through repetition that concepts come through to many of our kids. It is not a matter of concept teaching vs. drill teaching like the colleges would have you believe. Some kids cannot get the concept any other way except through drill. That is the weakness of contracts. Kids rush through their work without the necessary slow drill they need to have it sink in. Their concern is, "How fast can I do it?"*

What's The Big Idea?

I asked a dozen math teachers to give me the big picture of mathematics, to tell me what it was. These teachers represent nine or ten of the group:

> *Everything you do in life, everywhere you go in life you will have problems and we teach problem solving. And you need a procedure to solve problems.*
>
> *Preparing them for basic algebra in high school [by teaching] rational numbers, basic geometry and exposure to trigonometry.*

"Learning to think" is what mathematics teachers believe children get from math when they are successful. Whatever their pedogogical emphasis, a vast majority have their eye on a common outcome: "clear thinking" as demonstrated by solving problems. Three math teachers each with five or more years of teaching mathematics chatted with me in the lounge one morning and here is what they said:

> *I give half credit to students whose work is correct but who do not use the right method. [Another teacher says] The method is important. A lot of times they may be able to figure out the answer; but if they don't know the method, they may be able to figure out the answer but they haven't really learned anything. [The third offers] They haven't learned how to set it up because most of the problems they will have in the future they must be able to set it up and work it through a certain method. Being able to think is developed by being able to set it up, to work it out. There are some times when more than one method is possible, but that is rare.*

The weak students will spend more time trying to get the right answer from someone else, or from some other way than working the one problem themselves. I stress that you work on as many problems as you can and I'll grade you on the number you get correct. If they can work five of them slowly correctly, great.

During that conversation one of them described a phenomenon that should interest those who puzzle about how children think:

We have a few children in math--I have every year--that can take a problem and figure out the answer and never know how to put it down. I think there are children who really and truly can sit there and think and can figure out the right answer and that's the group of kiddos that bother me. What do I do with that group of kiddos? Do either of you know what I am talking about? I had a child who could get that close on any percent problem; but I never could get him to write it, I never could teach that child. I didn't know how to unlock what he naturally had up there. He was so far ahead of me on that and yet he could not work any problem completely and yet he could give you [snaps her fingers] that quick.

I asked what the big ideas were for students in eighth-grade mathematics assigned to level three. A teacher of many years said:

Mastery of one basic operation that we usually get in the second through fourth grade. This year I have more Mexican-Americans than I have had before. Basically 3s are Black and Mexican-Americans. But it makes no difference to them that I am White. Teacher race is not an issue. It makes no difference.

The simplest response I received was from an "old pro" who confided:

I've been there for over twenty years. What I have helps but it isn't good enough. Almost everything is way over their heads.

I asked about the matter of what the parents expected of children in level three:

Black parents' expectations of their children? "Sit down and let well enough do." Those who don't need to come to open house, come. Those who send back their signature really need to, but don't. The homework is not only difficult for their children--but for them, too. They just aren't with it. The school knows that. It is an extremely difficult problem and the interest is not there to study it.

A teacher who is highly regarded by her colleagues is amazed how children learn mathematical abstractions at all. She says we concentrate on the child who fails when it might be better to find out how one succeeds.

The quiet child, doing so well, probably wonders if that is all there is to learning mathematics. He wonders. His teacher also wonders and works with the poorest students.

But no wonders are worked.

Competition and Mathematics

Competition is widespread in River Acres in junior high mathematics. It is one of the things "that works." I asked a group of teachers what worked with any regularity in teaching average or below average students in mathematics:

Sending kids to the board. It's fast, diagnostic. I can screen and check on many kids in a short period of time. I believe teachers' colleges underestimate the value of skillful board work. In ten minutes I can get what it takes three hours of testing and grading of papers to uncover.

Another articulate teacher who uses competition in her group math games saw it as having:

One serious unfortunate consequence: the student looks to others to see who he is. He should look to himself. Testing has the same outcome.

Grades run a close second in the "what works" category--even for the lowest level.

For many of the kids the grade is the only thing that challenges them--particularly the upper levels. I have half my level three class that is not turning in their work and the other half turn it in only for the grade. No grade, no work.

Grades and competition are combined by some math teachers of level three students. There is competition.

For an individual's grade--not to compare with other kids. That is an upper-level kid that wants to compare. Sometimes a level three kid will work to get out of level three. The grade is the one thing that really works. The only other really good motivator is to get the kid up at the front of the room in front of their friends; they will perform. If you can get them up at that board . . . any kid at any level . . . you have got half the problem licked. They will be motivated to perform. Games and puzzles will work, too, but we do not have enough such materials! Fun things to do.

One department head said that competition was one useful approach with mixed blessings.

I like the idea personally and I like it in the class setting. Lord knows there are many facets of motivation and this is but one. But it is one that on balance gives positive direction, then I saw it is worthwhile. To the extent that it turns some kids off so they can't ever compete, then it is horrible for sure.

A serious problem in the eyes of counselors and teachers occurred a few years back when counselors noted students commonly were observed to have standardized achievement math concept sub-scores in the nineties and computational sub-scores in the forties. This is charged to the bill of modern math. For the past three years, teachers have been consciously working on computational practice. The school's criteria for placement in instructional levels are not written down, but they are known.

First: standardized test scores. Make no mistake about it, when things get hot and heavy the tests count more than everything else put together. You can shut anyone up with a test score: a parent, a superintendent, another teacher. If there is no standard test score then it's the teacher's word. Anything else comes last. The big "except" is a powerful parent: that's five aces.

Every opportunity for a fast student to go as far and as fast as they want to in this system. The problem is not with opportunity but with our wisdom in using it. We have too many kids not ready who are in pre-algebra. Not ready emotionally, not ready intellectually. Too much too young. So we skip the sixth grade. There will not be that many ready to take algebra in the eighth grade. In math we let kids cover the sixth-grade book on a contract basis. What I find is the kids' main purpose was to finish it fast. Rushing through was the main purpose. So I switched over to one textbook and started taking it as a class rather than on individual contracts [moving through book at own pace]. The fifth-grade elementary teachers overestimate the ability of the kids' readiness for pre-algebra. When I check their achievement scores, sure enough, they are below nineties [percentile on SRA Math Test] and eighties cannot do pre-algebra work.

Counselors say the honor of being in zero pre-algebra is considerable: "Kids can struggle beyond their competence to get in, and stay in, this group. Prestige is high." But not every teacher can be so honored. A long-time math teacher who is regarded as a successful teacher of the 3s confided that she longed for a chance to work with top-level students: "I have never been given children I can show anything much with by way of achievement."

I spoke with several junior high math teachers who prefer to teach the pre-algebra sections. One said she prefers to teach seventh-grade pre-algebra math sections because they are more math-concept oriented than are the sixth-grade sections which are more skill oriented. Only a few can really understand the use of rational numbers. She does think that modern math's emphasis on the use of correct terminology is a big plus. (This constituted a rare instance of a teacher or administrator saying an encouraging word about modern math.)

It would be safe to say that the "zero" sections or the pre-algebra classes in the sixth and seventh grades are the "darlings" of the junior high mathematics curriculum. One teacher who has taught the zero group is not sold on the idea at all. She raises provocative issues. She would like to teach pre-algebra to a randomly selected group of students to see what would happen.

> *If you will look at what happens here you will find that those who take the three-year pre-algebra course are not cutting it in high school. So what would be the great loss then? These zero kids are doing without eighth-grade math and they can't cut it in algebra without it. They take sixth-to eighth-grade math in two years and pre-algebra in the eighth. All but a handful of kids, who would have learned it without our help, just can't cut it in high school. They stub their toes in geometry and can't take Algebra II. The eighth-grade math in decimals, fractions and the like is what does it to them. They miss them, and they <u>are</u> required [to be successful] in Algebra. Another thing, it is forcing logical reasoning too early on the kids. They just don't for the most part have the logical reasoning capability at eleven or thirteen to handle that pre-algebra.*

Another teacher touched all the issues related to instructional grouping in his response to my question about his feelings regarding levels:

> *It is quite effective as it stands. I could argue the other way that the good students could help the poorer students if we did not group. We are just used to having kids grouped. It could be done another way. Any way has inherent problems. Now, a kid from a higher socio-economic level that gets thrown into a lower class, there is often pressure to pull that kid out, not because of the content of the material, etc., but because of the social class distinction, or race or whatever and that's a tough problem. Tough. Our grouping is far from perfect. Nevertheless, it is convenient for the teacher and for the kid. At least the kid is going to compete with kids in the same ballpark, so I favor it from that aspect at least. Grouping is imperfect. We don't have our criteria spelled out. The way it works is when a kid gets placed at a given level, the system's inertia and parental pressure act against his being moved downward. We need a better device for facilitating movement between groups. If it could be devised, groups would be fantastic.*

It is difficult to shift a student from one group to another.

> *There is very rarely a period in which all three levels are scheduled. This precludes shifting a student from one level to another, since his whole schedule would have to be rearranged. Very often it simply cannot be done, even if we were willing to try to do it just to change one class level. We set up one textbook with the other textbook sort of intermeshed. For one kid to move from a low level to the mid-level is tough--especially in the middle of the year. Different*

textbooks and different pace through the books by different teachers--a conscious decision we have made to not force page-by-page uniformity, skill-by-skill progression--makes us give up the flexibility to move kids up and down.

The picture is more clear and the results understandably more satisfying at the other end of the grouping spectrum. There is a "zero" group in mathematics which has been already identified as a source of teacher, parent and student pride. Upper-middle-class parents virtually demand the placement of their children in "zero" according to several teachers. It is a "pre-algebra" group. These students are identified by standardized achievement test scores and by fifth-grade teachers' recommendations. The junior high counselor then places a promising student in the zero group. There are "misplacements." The counselors report that about five students a week stop by to say "math is too hard." Mathematics classes are the chief complaint of the students. It is not seen as a serious problem. "Sixth-grade teachers come by and check a student's math [achievement test] scores --never their elementary school grades."

My favorite mystery story in River Acres came up again in the junior high schools a couple times. (It was not mentioned in the high school.) This time it appeared in the context of a discussion of a pre-algebra class I had observed.

In a pre-algebra class all you have to do is run through a diagnostic text with them to make sure they hadn't missed a skill, like division--if they had slipped in that, had not gotten it clear, they've got to have those skills. Then you can move on. The need for continued repetition with them is not there. But it is with a two and one level student. They understand it when you go through it; they understand it that year, that month, and the next month it slips out. The fact that they work through it successfully one time and work all the way through it again greater insures it . . . it's a matter of having conceptual maturity or cognitive skill. When you have it, repetition is not necessary; when you don't, it is. In fact, when we mis-test these pre-Algebra I kids and push them before they are ready, we could be stopping them from learning what they would have if we had started a year or two later. They are in zero and learning to dislike math and could be loving a good level one math course.

There were no mysteries to behold in Westland social studies: issues, pathos, and humor, yes.

Westland Junior High School Social Studies

The social studies in junior high school are the summation of three courses: world studies in the sixth grade, geography and history of Texas in the seventh, and the first year of a two-year required program in U. S. history in the eighth grade.

In Westland the students do "packets" or short instructional modules created at the local level. Little use is made of textbooks in many of the social studies classes. It is a "way around the reading problem" for some; and an indictment of the text for others.

The eighth-grade text does not meet the needs of anybody. It is about college level. The society in which we teach dictates the use of a textbook, however; so, even though I don't use it in class, I send it home every now and then to keep my parents at bay.

There are other problems associated with the use of instructional materials. Scheduling makes it difficult to catch up if the child misses hearing a cassette, for example.

> *If my student is absent when the first cassette in a series is in the room, it is quite likely he will never hear the cassette. If the second cassette builds upon the first, too bad.*

Depending on the informant, packets represent either "stuff we have been using for years, but now redesigned into packets," or "a new approach to the teaching of social studies." Regardless of the informant, the packets apparently were created at great personal time-cost to the teachers. The packets are not the outcome of the aforementioned district curriculum guide project, which was roundly panned by a majority of the teachers as a "waste of my time." "I should be spending time preparing to teach rather than writing those curriculum bulletins."

Each packet completion signals a packet test. Packets usually take two to two and a half weeks to complete. Students told me the test questions were all easy: "Except for a few [questions], they are straight out of the material." Tests are interspersed once a week for the level one and two groups--not for the 3s.

> *We test them less. We give them credit for just having done something. By now we have seven grades for level 3s and about thirteen for level 1s. The important thing to understand is we have to give them something . . . like to color an Indian or vegetables that the Indians gave the White settlers who came to Texas. And if they do a half way decent job we give them an A, which is hard to get.*

I do not believe this teacher spoke facetiously. She spoke nostalgically of last year when they had four levels and the year before when the district had five. Again, the counselors examine tests and grades to determine the placement of the students in social studies.

A kindly word for behavioral objectives was heard in this setting. "When they [behavioral objectives] let the students know what is expected, they are good. My filing cabinet with my unit-by-unit objectives can be easily moved, reorganized."

This teacher continued to say that the same could not be said for the Curriculum Guide which he worked on. "Once it gets set, it is not as flexible. Printed means finished."

Open Space

Open space is a tolerated rather than an enjoyed feature of social studies instruction. The prevailing view is that the district administration decided on the open-space architecture and they had to plan within that concept. But two young teachers said that open space means no discussion in class. When class discussion is tried, the arm-waving, laughter, and oral disagreements have the potential to distract over 200 other students not involved. The good news about open space is that the students can see that all the other teachers cover the same content that theirs does. "It shows them we are not being unfair."

What's The Big Idea?

There is quiet disagreement among the staff over how much of the social studies should be geography, factual history, and how much should be the study of man and his environment.

The only junior high school social studies teacher in the district that I saw approaching what could be called a controversial topic had this to say after class:

> *The teaching of man's relation to himself and others necessarily brings up religious, political, sexual, ethnic, social, racial problems and deals with very touchy subjects because of what shall we say, the Bible belt? The Bible and the religions of certain groups in certain towns who will forbid--who think these should not be spoken of in public. If you mention certain things to certain students it goes home and the school board gets calls about it: "Why are you teaching my child about sex?" or, "Why are you telling my child about this particular church?" You learn to deal with this by learning that this is not what the community wants so we don't do it. You have to survive in the community in which you teach. They are paying you your salary with their money, so basically they have the right to a degree to keep certain things out of the school that they strongly agree should not be there.*

The latter represents the minority view of this faculty. For that teacher who also said, "The social studies we teach is the dead corpse of past knowledge, not the life of man's thoughts," there was a quick-draw reply: "Yes, Hal, you would trade off the history of Texas for a classroom bull session on sibling rivalry."

Instructional Levels

A problem shared by most on the social studies faculty is a now familiar one to the reader: what to do with the level three students? "A lot of the sixth grade students in level three were passed on last year with F averages. I have them again this year. This is not a boy-girl thing. The same rotten attitude is shared by all of them." An administrator said they were, "Willing to turn their level three students over to elementary teachers of reading and arithmetic and [let them] give them a grade in social studies. It's hopeless the way it is now." He continues:

> *We strive to provide something students can sink their teeth in--at least the average and above average student. We are still far away from helping out slow learners. They are never going to use a good portion of what we give them up here. The whole program has to be geared away from history and more to learning about self. How can I get along in the world, with the fellow down the street, with my fellow students. There is an overemphasis in the entire curriculum regardless of level on factual history and factual geography. The basic facts we try to pump into kids--they could care less. "I've got a lot of history in my own attic." Kids are delighted to learn that they have at home the stuff of which history is made. I have a deep, closer relationship with many 3s than with 2s and 1s, even though I supposedly do a better job with them. . . . We should take these poor students away from social studies and teach them to read. It is better to help them to read first than to sit up here and be bored silly.*

Teachers team teach infrequently in this open space setting. One informant, a teacher of several years, said they did teaming last year, and:

Decided during summer not to do it because teachers felt they were not able to put their "individual stamp" on their classes. Also, they were unable to tell who got what from whom. Two classes were combined for two teachers with sixty-five to seventy students. We never did get to know their names. The open space area is unfair to the students. A lot of average to below average kids cannot handle the distractions. [It is] less of a problem for group one students. They seem able to block out noise, other teacher's directions to their classes.

General Practice

I asked a group of four seventh and eighth graders what the social studies were. They described what they were doing in their class that week. I pushed on, and the group agreed to this as their "final report."

It's something you gotta know. When you get older and some people ask you a question about what happened a long time ago, you can tell them. [Also] What different countries are doing. History of what people have done. Also, the history of places, and climates. How people get along together, their relations.

I felt like one teacher was really talking straight with me when she said:

We have many more Mexican and Black kids in three level. Very short attention span. [Pause] Self control is horrible. [Level three is the lowest in social studies.] They don't have the pride to give them the motivational drive. It is not that they are lazy. They just aren't proud of their schoolwork. So we can't give them reading. One-third of the 2s do their reading in class or their homework; about 5% of the 3s do anything. Now a lot of these 3s go to California or Mexico in the summer so they do have money, which is saying a lot for a 3 because I haven't been there myself. They think mommy or daddy or the state is going to support them all their lives. I tell them that it is a dream; that they have to start taking pride in something. Even if they are going to be a maid or a cook --and I try to say this in their own language so they can understand it because I say some words they don't know--whatever they are going to be in life at least be the best. Slashing the meat patties in McDonald's or what.

The in-migration of students is creating a particular problem for the seventh-grade curriculum in the social studies.

Texas geography is emphasized in this curriculum. Because most people are not from this area, it is difficult. They like it least. Those children who are Texans, have relatives here, like it most.

A little Texas humor was shared by this informant when he reminded me that:

The Texas Constitution guarantees [us the] right to subdivide into five states. They don't do it because they can't agree on who gets the Alamo.

The big problem which underlay the obvious student apathy toward the instruction of Texas history was nicely phrased by a young teacher:

The weak students don't care about our Texas history [pause] and the bright students <u>really</u> don't care! [He went on to say how important it was to relate Texas history to daily lives of kids to better motivate their interest.]

The following excerpt which begins Gerald Haslam's Tejon Ranch captures what some social studies teachers in River Acres wish their students would appreciate about the local history about them.

TEJON RANCH

Por Ramon Dominquez

An old cowpoke laments:
Today, driving freeway
fast past ranch, racing smog
to smog over scraped and
shattered hills, vivisected
valleys, my weary eyes
scan, pan arroyos and
canyons of my youth. Gnarled
oaks: saplings of my sap
days. From my grandson's sealed
and certain car, I gaze
far away, arrears, years
gut gone.

Gerald Haslam

Although it was not uttered for this purpose, advocates for curricular uniformity would find ammunition in the view of this social studies teacher of several years.

I believe that "social science" suggests too exact a subject [for what we do here]. It is often pretty much a matter of [teaching] one ideology against another, without exact evidence to prove which is better.

It depends on who is teaching [the section]. Eight different people mean eight different social studies curricula. We don't teach Texan history the same way in Houston as we do in Amarillo. Don't let anyone tell you different. The changes are subtle and very, very important.

We teach [students] a lot about the several things in social studies: geography, history, anthropology. But we do not help them to learn to get along with each other and that's social studies, too. I am put in a dilemma. I know what the Curriculum Guide says. I know that Austin requires me to teach so many hours of this, that and so forth--or you might get state funds cut off from you. But my heart is not in teaching seventy-two hours of Texas history. I see Texas youngsters who need help now in things that Texas history cannot provide. I am cutting my throat when I say that, I know . . . it's a dilemma.

In my final interview at Westland I got what I deserved. I had asked a group of seventh graders what the social studies were and understandably was getting nowhere. I asked what a social scientist did and one girl said, "You should know, you're doing it."

I cannot pull all this together for the reader or myself. Westland science, mathematics and social studies are not together in the minds of the students, the faculty, or the district curriculum writers. They are separate aspects of school instruction. Best leave them that way. On to Eastland!

Eastland Junior High School

Be careful . . . I could get mixed up. Same building plan as Westland, another charismatic principal! Crowded? Shacks in back for overflow. Just opened.

Eastland was still getting itself "grooved" during the period of this study. My aforementioned notes reveal I may have been unduly sensitive to the importance of this fact. I saw understandable differences and sameness in both junior high schools. For sure the Eastland faculty did not appreciate the student overload. They said "crowded" to me again and again. They were less convinced than were elementary teachers about the merits of open space. Interestingly, they provided the only instance of continuous team teaching that I observed beyond the elementary grades. How much of what was said and done should be ascribed to the "new building" is unclear to me. An administrator admonished me early:

Don't forget in your study that we just opened this school. You can't appreciate the social problems of opening a new school--especially if it is built to defeat you [open space]. Next year it will be better: less planning, more practiced.

The lively "Good Morning" of the Eastland principal preceded the day's reading from the Bible over the intercom. The student continued with the Thought for the Day, an aphorism on friendship. She wrapped it up with a brief devotional statement. The principal announced last night's winning varsity score, the losing junior varsity score, reminded the teachers of something, and turned the day over to the listeners.

A potential listening audience included 89 professional staff with aides and all totalling 107. The main building was created for 1650 student body maximum. Now the school has 2025 students spread over the main and eleven temporary buildings ("the shacks") which house the sixth graders. There are roughly 450 students of Mexican-American descent, and 175 students of African descent in the student body.

I had a long talk with four eighth graders about life at Eastland. They like it, "about as much as you can like school." They talked about school, homework, parents and self.

You hardly have any in social studies unless the class is bad. I bring home science everyday so my parents know that I try. My mom and dad think I ought to be making a straight A. I go, earth science is too hard for me, I can't do it. They say I can if I try.

Except for direct interviews with a dozen students, I learned most of what I know about student life at Eastland (and Westland, and Central High) by talking in the bus lines and over lunch in the cafeteria. The time-honored hyperboles were used by them to describe their condition.

It is like a TV prison movie. You sit there waiting for the warden to blow his whistle to let you go. Just about the time you get out of line, sit down to eat, they blow the whistle.

We got more privileges last year. In lunch we used to listen to the stereo but we can't now. Any little thing and you get put in detention hall or you have to clean up the cafeteria.

This school and all River Acres schools are under strict control. The prison metaphor is not apt. Rather I am left with a sense of old-fashioned orderliness. Some still do have that vestige of the fifties in their schools, and River Acres is one such place.

I worked at a cafeteria table within earshot of hundreds of kids for periods of fifteen to forty-five minutes over a three-day period. I did not hear one "X-rated" four letter word in that time. The girls dressed so maturely and stylishly: pants suits, fine sweaters and dresses, hose. Boys in leisure suits were seen from time to time. The "excuse me" and "pardon" were too frequent to count as we encountered one another moving through the hall. The obvious social courtesy of these youngsters impressed me.

The old-time sense of the rule, respect for property, authority and self will be treasured by some readers. It may be that the forces that keep this intact also act to insulate teachers and administrators in River Acres from other national trends. All this and more can be seen in our first testimony on science instruction at Eastland.

Instructional Levels

River Acres teachers, administrators and counselors not only believe that grouping for instruction is practically the only way to go, but they believe that they have evidence that it makes a difference how you do it. One junior high counselor commented on the movement from five to four to three performance-grouping levels over the past three years.

> *Kids that were rebelling are now passing, doing their work. They now have audio-visual work for combined classes. One math teacher was in the area with her level three kids. She took them out to the temporaries. They got worse. She believes that they lost peer control.*

In another instance, a counselor and faculty member's remedy was to move from three back to five levels.

> *When the six-week report showed forty-five to fifty-five failures in science in each of the sections in eighth grade, she called them all together. They decided how to remedy it. They took all the level 2s and pooled them during the periods they had common sections, divided them into high, medium and low sections. We got new rosters and began anew.*

There is no performance or ability grouping in the elective areas K-12 in River Acres. Obviously there is self-selected ability grouping as in team sports and orchestra, play productions and the like. I talked with three seventh graders about science one morning before school. They said that levels were "okay."

> *The problem is learning which teachers like which kinds of answers anyway. Some want them exactly from the book. If they aren't [exact], "That's sloppy thinking," says Ms. X. Mr. X says you really don't know it if you can't put it in your own words. Now, Ms. X is right because just any old words won't do for telling about, let's say, atomic stuff. And Mr. X is right because when I really do know it I can say it in my own words. But it is all mixed up and it is hard to tell sometimes which is right, which is the right way. So you better know what the teachers' answers are or you will get graded down a lot. [Q: Do all the kids know that? Unanimously, "All the level 1s do."]*

I heard from several different students in several schools that going to the counselor about levels was "a good way to get out of class" (the counselors said that did happen). Students go to counselors for electives and teachers go to the counselors for the basic subjects. A seventh grader said:

The teachers want you to be in the right place. Most people who are in the wrong level get changed. Everybody is about right where they should be. It all works out right.

An administrator in the district office summarized the importance and functions of levels for me during my last day in River Acres:

I am proud to have a system that groups on performance, not on aptitude. In the ninth grade the aptitude tests would suggest we have a 50/50 split in mathematics--but it is 75/25 girls over boys. By the time two years pass, it is reversed. Motivation, not aptitude, is the reason this occurs. Kids, particularly boys, get bumped down a notch [level] if they are not motivated. We find this mainly to be true of boys. It's got to happen [this way] where we take a hard line on homogeneous grouping with the teachers having a heavy input [in the grouping]. One problem is that kids may sandbag to get down one level below their struggling level.

Open Space

A panel of eight junior high school students (representing no one other than themselves) told me they would vote to:

Get rid of the open concept, especially in the mathematics area. Wherever you read or have to concentrate. You really don't have to concentrate in social studies so it's okay there. [All agree] And whenever you have to sit in the back of a noisy class and you are closer to another math class than you are your class, it's hard.

I did not ask the sixth graders their opinions since they were instructed principally in the temporary portable buildings, but a precocious seventh grader who had been in open space "only for a couple months" shocked me and her teacher when I asked her how she would describe open space in Eastland to a friend that had never been there.

That's when a school has separate areas for the teachers separated by blackboards, bookcases and things to make it look like a regular school. Since there is not many doors to separate areas, we can go practically everywhere without going through a door to get places. I don't like it for reading. The noise gets to you especially in RWS.

Other students said that they had been in it for over three years and it did not bother them. "I guess I just don't notice it very much."

My impressions are mixed as to how well the students like or dislike open space. I found students who had been in it for several years and liked it and others who disliked it. I found students who liked and disliked it in their first semester. Similarly I found no pattern associated with students of level one, two or three. The issue is clear for the child who needs or treasures quiet space. "At home in my room I can get a lot more done. Some other teacher is forever yelling at someone in their class and that bothers me."

The chief rival to open-spaced grouping for conversational leadership among faculty is the correlative matter of basic skills instruction. An administrator who had taught for several years in the district offered his rough and ready estimate of what is confronting junior high school teachers in the district.

Fifty percent of our children have a fundamental problem or set of problems in a basic skill area. It is almost always reading or arithmetic but it shows up in science and social studies, too. I'd say 25% of the students cannot read any directions of any sort, and I am being conservative. I would also have to honestly say another 50% will not. If you could solve the problem of reading and following directions you could be the governor of Texas.

Before discussing the science curriculum in Eastland I should like to close my introduction with a pointed reference to a wicked, four-second, E-flat dismissal tone, which I suffered daily at Eastland. That, I shall never forget.

Eastland Junior High School Science

Teachers believe there are sweeping changes underway in student attitude toward school, its work, its importance. I discussed this as the "New Crop" earlier in this report. They see the first waves as having hit the beaches in science with larger ones looming off shore.

We have lost our work ethic. School is for entertainment. Parents, teachers and children have lost appreciation for education. They want to be rewarded for performing any kind of work. Rewarding effort no matter what the quality of the product is a part of it.

When this perception is added or melded with one of increasing parental and administrative pressure for achievement (manifest in good grades by their children), the teacher "gets a bit anxious." Evidence of an attempt to "do something" about the science curriculum is on hand.

The science curriculum experiment of 1976 discussed in Westland Junior High was also attempted in Eastland, wherein all science teachers taught all grades and all science curricula. The same results were perceived by Eastland teachers: poor. "I stumbled through it . . . We were so thin in our preparation that we did no justice to anyone." A fair representation of the faculty's view at both schools--this one by a teacher with more than ten years in the district.

Another sixth-grade teacher said, "It revealed to us all how weak many of us are in physical science, chemistry, physics; and our textbooks don't help a bit. . . ." This should not suggest to the reader that the faculty is seen by themselves or by the high school faculty as weak. In fact it is regarded as strong and getting stronger. The overriding issue at Eastland in science instruction is crowding: "We have three kids for every lab table where there should be two. Forget the 'hands on' stuff; it forces us into tell-and-show demonstrations which we call laboratory work."

General Practice

The science curriculum is general science in the sixth grade, life in the seventh and earth science in the eighth grade. (Earth science is seldom taught beyond the eighth grade in Texas.) In all three grades teachers say their "average student is at grade level." The classes tend to be larger at the top (the 1s) with roughly thirty-five students per section, growing smaller in the middle (around twenty-five) and smallest at the bottom (one had seventeen). The sixth grade has almost all laboratory work. The seventh has

four groups in an area with laboratory space designed for two and the eighth is in similar shape. (The laboratory tables are rarely used under present conditions, nor are the audio-visual materials.)

The district has a good record in the teachers' eyes about supplying equipment and supplies. But once they break down, that is the likely end of their utility. During my stay teachers were trying to figure out a solution to the problem of using a bioscope screen. There are no shades on the building windows, and a mis-wiring of the building means turning out lights in one corner of the section would turn them all off. One of the two AV areas in the building designed for general use is a detention and study hall room. Teachers do not feel distressed by all this. I asked about their use of the resource center for science.

> *A laugh. Two [teachers] have requested materials to enrich the science library. They have requested books and none have been purchased. Encyclopedias they have. Have you ever looked in one? Way too hard for sixth graders. I can't even find things in them. In general, the resource materials are scarce; and when we have them, they are too difficult for the students.*

Another made the distinction for which science she was teaching: "Library? Okay in life science but weak in earth science. Library has stuff which we don't know about. No communication to us."

And a third teacher offered the antidote for her resistance: "My kingdom for a science dictionary. That could get me to [use] the resource center."

Not with an eye to overkill, but because it is so, the story on between-grade and between-school articulation in science is no story at all. There is latent interest in changing that story.

> *We never meet with the science team leaders in the elementary school. They should be teaching some of these concepts. At the end of the year we meet once to select students for their honors classes.*

And another teacher suggests:

> *Surface [was] just scratched in curriculum coordination in life science because that is where our eighth graders are headed immediately [ninth grade biology].*

A further suggestion was heard, local in character, but it could be heard as a plea for help nationally.

> *They care less and less about their grades, about passing [to high school]. But it may be a change that comes with a growing area rather than the times. Frankly I can't get to some of these kids. I don't know how to do it. If there is anybody who can help me get there, have him or her come on out, I'll take the first ones. This must be all over the United States. I'm sure it is not just this district.*

Earth science has the greatest number of student failures of any junior high course in River Acres. Teachers say this is because it is less descriptive, more conceptual and process focused (not in pedagogy but in understanding processes). Input in nomination for students' least favorite subject in the junior high school: physical science.

A former science teacher, now an administrator, offered the interpretation that earth science problems are understandable because earth science emphasizes process and is less descriptive than biology. "Teachers must become more aware of teaching process; something beyond telling students 'This kind of crystal structure exists because. . . .'"

The wide range of earth science content is generally accepted as a facet of the shared agony of teachers and students alike. Teachers need help. Students say, "Only the geniuses can get it." Counselors' and teachers' assessment of what consitutes the instructional levels in this course do not agree. The instructional materials are often reported to be "inadequate or mismatched for all except the level one kids--and even too difficult for them."

Instructional Levels

The story is similar to the one told at Westland Junior High School. The top-level students are generally appreciated by the faculty and the "do-do's" are the bane of their existence. Nearly all the faculty want more (rather than fewer) levels.

> *We all prefer four levels to three. The "bad-news 4s" could be isolated [for reading instruction]. Now they contaminate. [All agree that their special regrouping system vitiates the levels.] On occasion the counselor will send us 1s at the year's start and we pre-test them as 4s. It shocks the kids.*

Another teacher with her eye on the 3s said: "We need a verbal-oral/listening biological and physical science curriculum for non-readers."

Open Space

Open-space architecture is seen as useful for warehousing the extra numbers of students but not without paying a price. The necessary absence of carpeting in the science area, for example, adds to the inherent problem of noise. "One time I yelled at a kid for talking too loud and it was Martha!" should give you an idea of what the teachers think about the noise level. On a particularly noisy day an instructional class can be at the level of the cafeteria, but it did have a different feel to me as an observer. I asked a teacher about this difference I felt and got shot down with, "Yes, you have a fine ear, Mr. Denny; it's the difference between a yell and a scream."

No one in the district teaching at the junior high school level had formal training in working in open space, nor in team teaching. One science team teacher said the situation "pressed" them into team teaching. "Better to go crazy together, than each alone," joked the young leader. They are committed to continuing it, "Even when the new junior high opens and the numbers [of students] go down." They say it is no panacea but clearly preferable to "going it alone."

> *We're trained in four institutions in three states. . . . Feel guilty about missing a day of school if you are letting your team down. Loyalty. But if you have to, the substitute can get real help from the team. When one of us is weak in an area we can shore it up. Our tests are so much better now that we are doing them together. [The team is cross-sex, bi-racial--but all young.]*

Team teaching in open space junior high school with fixed class periods is an enormously complex activity. Activities like showing a film a second time, or extending an activity for an extra period, or following a personal hunch when the teachable moment presents itself are difficult or impossible to do.

What's The Big Idea?

What is science? For kids it is either "animals and plants plus some math" or the course they are currently taking plus a dash of space and "laboratory experiments like on TV." For teachers I found no universal theme. A couple saw it as the last chance to give kids an understanding of the earth sciences. "They will never hear of it after the eighth grade." For another it is the representation of what scientists do. For two others it is a blend of "about 50/50 inquiry procedures and big concepts." For three teachers of widely ranging experience and who teach all three levels it is a matter of covering the fundamental concepts in the textbook, be they life, physical, or earth sciences.

As was indicated, the earth science curriculum has the greatest number of student failures, about which there is faculty and counselor contentiousness. The biggest science content issue presented to me in the grades K-8 was in earth science. One old-timer gives the historical background.

> *In the old days when we were much smaller we were much more relaxed and did our own thing. Now we cannot do what we like best. The pressures from on high are mounting and we feel them. . . . These pressures are supposed to be "content" but they are more "how" and "when" pressures. The curriculum is getting more organized so that we all know what we are supposed to do. If I do not want to do something, nobody is going to make me do it, yet. You have to sacrifice something in earth science when you get organized and I believe it is the teacher's pet specialty [where he will try] to get the content covered.*

What he and several of his colleagues are saying is the "big idea" in junior high school science is the subject area you know best.

Instructional Materials

The departmental chairperson talked with me about life as a science teacher:

> *There are only a few places in the United States that I know of that the local districts can select their textbooks directly from the publishers. I don't think the reading level is too far above, but it is above, our very best students. But I don't think that "hands on activities" can be related to concepts by the students. We demonstrate because the equipment was very expensive and we are very crowded [the coriolis force].*
>
> *Last year they stole the ball bearings, went berserk, and played when they did the coriolis experiment. They just made a complete shambles for me. We have to have a very structured lab before they can do anything. They can't handle it socially and they can't handle it conceptually. The best student will say, "Oh, I really enjoyed the lab but I didn't like to answer the questions."*

The reading level of the textbooks in earth science was mentioned as an insurmountable problem. One faculty member told me she knew of an earth science text written at an elementary school reading level (fifth). Since it was not on the state adoption list, it thereby was excluded from use in River Acres (unless she wanted to purchase it).

Another group of science teachers at the eighth grade doubted the claimed grade-level reading difficulty of their text, checked it, and reported the following:

> *The text is on an eighth-grade reading level according to the publisher but we measured it and it is 10.2. All the ones on the TEA list are above grade level and lots of our kids are below level. [Two-thirds of the Texas districts have adopted this text. I wonder if they experience similar difficulties?]*

Several parents of junior high school age students told me they appreciate it when teachers assign homework in their child's textbook. One theme that cuts across parents' views of the school was that of "preparation." When their children have homework in junior high they see it as good preparation for what they believe is to come in senior high. A teacher of several sections of low-level science agreed.

> *Parents love textbooks. It means homework, responsibility, real school to them. They don't know what the kids are doing but they really eat up seeing them bring books home.*

But the use of textbooks in the lower levels is not universal in Eastland. The seventh-grade team--which re-groups the students at the beginning of each unit--does not use the text for the second, third and bottom levels. They hand out notes, packets and rewrite the text materials. They do use the text for the top group, where the competition is "rip roaring."

The Dissection Lab

Teacher-education literature and courses are replete with poesy about the teachable moment, the integrated day, peak experiences, the intellectual quest, and the fulfillment awaiting the dedicated teacher in the classroom. The "Dissection Lab" is more like it, to my way of thinking about public-school science teaching.

The day is a nice one and the apparent interest of the students is reasonably high. Certainly the general attitude is a favorable one. Smiles, friendly conversation and heads turn toward the teacher at the bell. She passes out a dissection kit to each pair of students. In the kit are two probes, one knife, one tweezers and a pair of scissors. She begins the forty-five minute period by asking, "How many tools are we supposed to have?" Many answers come at once and she hushes them by saying: "How many probes? How many tweezers? Does everyone have a pair of scissors? Raise your hand if you do not. How about a knife? Good, every team has five things in its kit. Good." During this time there are several interruptions of sorts. The P.A. system accounts for one--something about a practice that must be attended by someone. One group has only one probe in its kit so she rummages through a supply drawer and comes up with the needed item. Another student does not have an item and then it appears magically. Another group has "stolen" parts of its neighbor's kit. Ten minutes of the period are gone when the teacher can now say:

> *"Let's start the dissection."*
> *"Ms. Marcum, we don't have a knife."*
> *"Good gravy, why didn't you say that earlier?"*
> *"We didn't notice it until now."*
> *"Ms. Marcum, how many props [sic] are we supposed to have?" (asks another student)*
> *"You people just don't pay attention; I'm not going over <u>that</u> again."*
> *"But we didn't hear you."*
> *"Well, start paying attention. The whole group can't wait for you people."*
> *"Albert is already cutting! Hey, Dr. Albert, is he dead?"*

Around fourteen to fifteen minutes into the period the students begin the laboratory exercise and a whole new set of questions come forth. "Are these the questions we are supposed to do?" "Which do you pin down first?" The teacher moves quickly from one group to

another offering suggestions, answering the same questions over and over from one group to the next. (She had discussed each of these issues in her introduction.)

The class ends with a nine-minute clean-up period in which tables are tidied, notes are gathered, tools are returned to the kits and students re-group for the next period.

I spoke with Ms. Marcum about the lesson. She is in her third year of teaching. She observed that the lesson was just "about par for the course." She feels that demonstrations work better than does lab work with the lower groups for a variety of reasons. First, the problem of supplies is solved: "Curriculum kits cannot have very many pieces or they 'fly'." Secondly, the problem of discipline is greatly reduced: and lastly, her energy is directed toward teaching rather than "rollerskating from table to table saying the same things like a broken record." She speaks for most junior high science teachers in River Acres when she says, "The mass laboratory just doesn't work. Too much time is spent getting ready (and ending the period) and too much confusion occurs. But we gotta do it."

I told the "Dissection Lab" story to Ms. Laramie. She was noncommittal; listened politely and said, "When you have taught as long as I you get to know what works with kids and what doesn't." Ms. Laramie has taught science in three grades in junior high, again and again. She felt kids liked to do things, not speculate about what they had done, or were about to do.

> *Kids like dissecting earthworms or whatever in the seventh grade. They are very disappointed that there is no dissecting in the eighth grade. That's the highlight of junior high science. There is no sixth grade highlight. Kids like the labs; if they can just do them and not think about what is next. They don't like that.*

Another science teacher sardonically said what works may not be the "right question."

> *Kids can dissect a grasshopper, an enormously useful skill [wry smile] and can't give any reason why there are no pecans locally [every third year]. They study DNA and RNA and don't know what electricity is.*

I turn to mathematics where the answers and questions of students and teachers were equally forthright.

Eastland Junior High School Mathematics

"It must be Friday. I can hear myself think." So began an interview early during my stay at Eastland. She was saying a lot. I did not know it at the time, but Friday was (is) test day in mathematics at Eastland. Each subject has a day of the week reserved for testing. This spares the student the fate of getting more than one test on a given day in the week. It also assures the teachers of at least one "quiet" day a week in open space. A math teacher not at work at Eastland would have to be one that had expired on the job. "We bust our butt for these kiddos," was said and easily seen on several occasions by the writer.

The department head of the math faculty uses his "free" period to teach remedial mathematics. I saw other members of his faculty working with students before and after school. My notes show a one-liner from math at Eastland, the origin of which I have lost: "The best thing in this district and in this school is people--especially the kids. They are all Mr. and Miss to me. I respect them."

Nagging Problems

Scheduling and crowding are problems to be endured--but not without comment. The scheduling affects teacher behavior. There are discrepancies in the length of the period that cause problems for teachers with multiple sections. The second period is forty-five minutes and the fourth one hour and six minutes. (The fourth period is a split lunch period.) One teacher with two sections of the same class asked rhetorically: "How can you use the same text, with the same math objectives with one period [being] 70% of the other?" The crowding affects student behavior.

> *I used to have five classes of twenty-six back at Central Junior High. Now I have six classes of over thirty. Students know I cannot keep tab. So "advantages" are taken. Lack of peer control makes more behavioral problems in the snacks.*

She refers to the fact that the sixth grade is not taught in the main building and believes that peer modeling by seventh and eighth graders cannot have the presumed positive effects it has had in her experience. She could be reflecting the views of a colleague out in the temporary buildings. In general there is little communication of a curricular nature that flows between the sixth and seventh or eighth grade teachers. Communication was cited as a problem by the teachers in a couple respects. First, there is a lack of understanding about central administration decisions which affect curriculum. For example, two teachers said they thought this year's reduction in instructional levels emanated from the Texas Educational Agency. Others said they did not know the criteria counselors used in making assignments to levels. Second, there is a nagging problem of communication between the teachers and the parents. I asked a teacher who had been on the phone for thirty minutes during her free period how effective her calls to parents were.

> *Forget them! My notes are not acknowledged by them. I've never phoned so much in my entire teaching experience. I have not been contacted by one parent in two years to talk about what a child is learning, and I call at least two parents a day.*

She is not an unusual teacher on this mathematics faculty. (Nor the science faculty, for that matter.) Free periods are commonly spent trying to give feedback on student progress to parents of children in levels three and two. What they have to tell parents is not what parents like to hear, of course. It is usually about grades, scores on teacher-made tests, or homework.

Tests

Students in the top and bottom groups often share an interest in grades--more so than do the middle or "average" groups. Kids and teachers share a low view of the standardized achievement test scores. At least in the sixth grade, the desire to do well in school is carried over from the elementary years, as one veteran teacher sees it. "Kids can see more than we measure either by our standardized tests or by our letter grades. The sixth grader wants to do more and feels inadequate of what he has not learned. He is mortified. He doesn't need to be embarrassed publicly." Another made a comment on local and national testing of children in mathematics.

> *Scores, scores. Too much emphasis on them. The reason the scores are going down nationally is because of things that aren't mathematics. Lower-level kids fail tests but know much more than we test. Lower-level kids stay in school longer and get tested, they wouldn't have been there in the forties or fifties. The press features results on a paper-and-pencil test designed for the able, abstract, quick child. That doesn't tell me anything about our nation's children.*

I read that quotation as a tease for a group of eighth graders in Eastland asking them if they, "Had teachers in mathematics who felt like that?" They said, "Maybe one or two." They seem to feel that tests, "Show them what we don't know all right."

Instructional Levels

Whether the levels are seen to be working or not depends on the grade level the informant is teaching. At one grade there is a "counselor problem."

> *They aren't working. The teachers' recommendations are not heeded by the counselor. Kids are allowed to switch from level two to three without so much as a courtesy call to the teacher. If I complain I'll get the next ones to move into River Acres.*

At another grade, levels work nicely. While it is true that the biggest amount of student traffic in the counselor's office is math related, "It works out pretty well for all concerned."

That counselor said that for everyone that wants to go up a level, five want to go down. (Boys want to drop a level more frequently than do girls.) This is a peculiar trend in that across all subjects about two in three requests are to go up a level. There is another consequence of level switching in mathematics that is sex related: "Moving a girl down is usually big trouble from the parents." A counselor and a teacher and the department head made similar observations on other patterns of girl students in mathematics learning. The best students sometimes do not like mathematics. While boys who do well in mathematics can be counted on to like it, this is not the case for girls. Some of the highest performing girls have confided to the counselors that they really don't like mathematics. Such comments are not made for the benefit of the boys (who are not there) and are not related to whether they like the teacher(s).

Another teacher said, "I have the feeling after twenty-three years that my top boys understand mathematics better than do my top girls even though they [girls] will score better." (Can't give reason. Not sexist.) Whatever the case or reasons for such interest and/or competence, the lowest levels are populated more by boys than by girls, with a disproportionate number being Black and Mexican-American. There are no student or parental complaints about the concept or use of levels beyond the individual case which is usually settled by the principal, after consultation with the counselor.

The most frequent problems in teaching occur with the level three students--but level two can be problematic, too. A teacher of three years in the district, who teaches level two and three, put her finger on a common problem.

> *When the rest of the children are ready to go on there is no place to put children for remediation; for short term remediation--not a lower level for a whole quarter.*

Last year Eastland had a remedial reading and mathematics program paid for by federal money. This year it is reading only. When the program was in effect, bureaucratic red tape got in the way of instruction for some children. "We had to kick some special education kids out of Title I mathematics remediation [reading/arithmetic] because of the 'no-kids-in-two-federal-programs' rule."

Level three mathematics is often taught a grade, or two, or three below the child's current class assignment. It consists often of practice on the basic facts in multiplication or division with some attention to fractions. Story problems of the garden variety

are used when reading skills permit. The best description of the curriculum-in-action for 3s was succinctly offered by one of its clients. "In level three they teach you what you need to know from the beginning. In level two they already know some so they start further on down." Students knew only one kid who went to level two from three; and not one has come down from level one. What's at the beginning of the level two book is the end of the other level three book.

Students frequently dazzled me with what they could tell me about the curriculum, its content, teachers' expectations, and their part of it. How could these children know so much about the levels and the curriculum and be such failures in the classroom? (On the other hand, I recall Mel Tillis never stammers when he sings.)

Teachers feel that the usable portion of the textbook is quickly exhausted in their level three sections. The rest is "theory or far-out things." To cite the limiting case: in one section the week's regimen is text-based on Monday, and it's drill for the rest of the week.

The Curriculum

I have written elsewhere of the district's attempt to get an "accountable uniformity" to the curriculum in the subject areas of this study. They have commissioned department heads, team leaders, and selected teachers to write curriculum guides. These are completed in science, mathematics, and the social studies. Their use by faculty has been spotty. Curriculum guides are an old administrative siren song to which established teachers have long since learned to cultivate a deaf ear. The Guides represent unhappy days and dimly recognizable advent for many. And old timer speaks:

> *Curriculum is a dirty word in our faculty. The twelve of us feel we have put too much time on the curriculum. And most of it is words. We need something simply based. Lots of recognizable everyday applications. Facts and applications have been slighted in our time spent on terms.*

The "dimly recognizable advent" is an accountability procedure underway in one elementary-school pilot program in the district. A mathematics teacher of the top group says she feels the curriculum efforts are more than a guide. "We go by the curriculum because we are accountable to it. That is what is coming more and more. Quarter exams are the forerunner. The probation period for new teachers is a part of it."

Evidence of the spotty use of the Guide is seen in the following comment: "I don't use the Guide. I would rather my kids learn five concepts a quarter than nothing." She feels there is too much mathematics and not enough practice and application in the Guide. Her thinking is echoed by a colleague who teaches only the 2s and 3s.

> *Let's take number base for example [I watched her work with a group on base two later that week]. I am lucky if half my 2s can get it. But they say to keep plugging at it for the 3s. My land!*

The drill and application needs are seen as a cause of the down-shifting throughout the levels by boys.

> *Student-initiated moves to lower levels in mathematics are on the rise. Concomitantly the really hot-shot kids are not being challenged in mathematics. There is more than enough mathematics in the curriculum. What we are short on is applications. The curriculum guides have not visibly improved instruction. In both science and math. Also in both there is a lack of close personal attention in regular math classes and science.*

Another teacher, one with three level three sections, sees the repetition as integral for teaching the 3s and the source of the "hard and dull" label stuck on mathematics by most of the 3s.

> *The redundancy of topics, grade after grade, is built into the Guide. It is in the texts, in our tests. It's in the cards, I believe. We are in a trap. They still don't know their fourth-grade math and they are in the sixth [grade]. Therefore, repeat it. Now you know what the kids say; you saw them: "Oh, Ms. Helene we've had that!" So, we can look good on paper. Better than what we are. The TEA [Texas Education Agency] would love it. But except for the 1s [and zeros] and the skill and dedication of individual teachers, the curriculum is not as good as it looks. Am I right?*

The Zero Group

In Eastland, as was the case in Westland, there is a pre-algebra section in the sixth and seventh grades.

> *Zero is good. The best [students] gripe about it [the math] and enjoy it. Kids who drop to level one in the seventh are bored stiff. About three-quarters of our misplaced [over] kids are girls. There just about can't be any problems in zero, really, because when the child has the IQ, she can learn just about anything.*

One teacher said it was, "Such a piece of [pedagogical] cake," that they [the zero sections] ought to be assigned to the three shortest periods in the day (see the earlier discussion on scheduling). The level 2s currently have that assignment. A central district administrator feels that zero groups have been successful to the extent that they should be broadened to include more children. He also felt that the eighth-grade teachers may be too prideful of the achievements of the zeros and not sufficiently appreciative of what the seventh-grade zeros had achieved before entering their classes.

Some of the halo was dimmed by a teacher who has been with the zero concept from its start.

> *I have forty in my zero group, [with] four fixing to leave at quarter. The upgrading of math occurred four years ago. (Zero group pre-algebra introduced.) Good pure math. A lot more than could benefit all the zero students. What is lacking in the textbook is applied mathematics. (Textbook, Dolciani's Modern School Mathematics.) Even the average text goes into properties. A kid just does not have to know "commutative" and "distributive" to function in the world.*

And another swipe was taken by a teacher who is recognized as a "super" zero teacher by two colleagues.

> *There is abundant evidence to show that we are encouraging superficial learning in some of our zeros. Sure, they do well on the tests. Our materials on hand encourage this. The algebra book, for instance, is pure abstraction. The really good memorizer can go right through and not really have it at all.*

I have saved the unkindest cut of all for last. It won't topple the head of the zeros, the pride of the mathematical royalty. But there is at least one Whig in the palace. I spoke with a "hard line" teacher who had taught algebra several years in high school who said:

Either you teach algebra or you don't. There is either a sequence in instruction or there isn't. Those teachers who pick and choose in the texts for pre-algebra are kidding themselves--worse, the kids. What they pick and choose is what the kids can learn to do without understanding algebra. The worksheets on line equations are a case in point. By the teachers' count, half the kids had no conceptual understanding of the work involved. Understanding the process of symbol manipulation is crucial--and you don't need to engage in formal proofs to get understanding. You [the student] ought to be able to look at an expression and tell if it would be an indicated sum or an indicated product. Most River Acres students can't.

The problem most common to us teachers is that we can't keep real algebra exciting for the students. When the students ask, "How am I going to use this stuff?" our usual answer is foggy. The only answer is in higher mathematics. There is no practical value other than that.

Now that's a tough quote to follow. In anticipation of the Central High mathematics picture, I can assure you of its compatibility with the view held by faculty who teach "real" algebra (the algebra curriculum taught in one year--versus that taught in courses spread over two years).

Open Space

The resources needed to teach the mathematics are seen as ample by the faculty. In fact, there is a curious reluctance to use resources (other than pedagogical wit) on the part of most. "I have all I need. After all, we have an excellent faculty. Too much dependency on AV can depersonalize the relationship we have with pupils."

One teacher called for at least one projector to be assigned to each subject area. And another bemoaned the absence of a chalkboard. It affects teacher demonstration, and pupil boardwork (a favorite of many of the math teachers). Several teachers said that the chalkboard work by students was vital for level three students in particular, so that teacher feedback could be immediate. "You can be sure a child is concentrating at the board. You know he is doing his very best there and [that a teacher's] corrections mean something to him."

Concentration is a "heavy" word in open-space mathematics teaching, as the following excerpt from a teacher interview confirms.

It's hard for me to concentrate in open space. I don't care what anyone says it is hard for me to concentrate and have you ever tried to concentrate when you can't? My students don't like open space and neither do I. I dread going to main building next year. I can pick out those kids who come from open space elementary schools. Hyperactive, don't want to sit still. ["The open space concept provides teachers with opportunities to team teach, doesn't it?" I asked.] Teaming in open space? Ha! What kids see is teachers who can't get along. I've got enough [instructional] troubles without teachers arguing in front of kids. Some of our very best teachers do not like it.

Others say they are "treading water" waiting for the new junior high to open. The noise is recognized by nearly all teachers as being high. (I had to suppress a smile a dozen times a day when I passed one teacher who desperately tried to quiet her group with a long "sssssshhhhhhh"! One kid, at least, calls her "Old Leaky Valve.")

In point of fact I watched several teachers working with children who were seated closer to two other teachers than they were to their own pupils. The seating distance is important only in that their pupils were being "talked to" more "closely" by those teachers. Similarly, the students responding were sometimes from classes other than their own! The style of one teacher was to huddle his group up very close to the front of his area. Most just shouted the word over their area.

I think you can see that no one here was trained for open-space teaching or for teaming. We are not open. But it is okay, really. My only dislike is the time schedule. That's what puts the lid on the idea. Open space makes the district look progressive but the ideas are the same old ones. And that isn't necessarily bad, you know. We are "old school" in our leadership. Wouldn't you like to come back and see what we are doing a few years from now?

You bet.

Cross-grade Communication

By now the reader knows this topic is a dead horse in River Acres. There is very little resident knowledge about what other teachers do in other grades, much less other schools. The math picture at Eastland supported that story--with three important exceptions. One administration informant had the larger district perspective that most lacked. He had taught at Central High School and now has first-hand knowledge of the elementary schools. His comments, while not focused on Eastland, are noteworthy.

We follow the state textbook program. The Dolciani series is about as good as there is if the kid can survive it. A lot don't. We have a good math program. We give a little computer experience, but not much. There are no mathematics issues in the high school to speak of. The issues are at the junior high and elementary levels. When we went to the new math in 1964 or so, we were basically opposed to it. Some of the elementary teachers went hog wild; e.g., one third grade teacher would teach a modern math concept all year and never let go--(merely an illustration). We saw a skill decrement in the early 1970s, so we have hit our elementary teachers with the importance of drill and memorization requirements for the past few years. A few years ago, the super section in our eighth grade did better on a computational test than did our high school trigonometry sections. That did it! The young teachers have been reared and teacher educated in modern mathematics, so it is hard to get them to emphasize drill and skill development.

A fortuitous spin-off of a personnel transfer can be a personal integration of the mathematics curriculum across the junior and senior high grades. "I have a much better opinion of junior high school mathematics teaching than I had before I was here. We are getting better new teachers than our old guard. Paired teams are starting to form. We are on the way up."

The transition role of the junior high mathematics faculty and curriculum can be inferred from the following view held by a key district administrator.

The movement from elementary school where it's the same math packaged a little differently for all fifth graders and titled the same, "fifth grade mathematics," to high school where it is five different courses in mathematics all with different names, is great. No Man's Land is grades six through eight where the elementary philosophy is continued by folks who don't necessarily believe in it. It's in the ninth grade that the crunch comes. It takes about two years to whip the kids into shape. They darn near will defeat the teacher in the ninth grade. I am talking about good and poor academic kids.

Five eighth graders were having a bull session in the cafeteria about what is coming in Central next year. I was listening so intently from my table outside the entrance to the locker room that I was nonplussed when another lad asked me, "How much do you want for your socks?" (The table had a sign advertising the sale of P.E. socks.) This is one way to begin an interview. One boy whom I recognized as a level three math student said this about the high school math curriculum. "My brother says teachers do the same thing they do here if you're in lowest level, only the classes are longer--they have six periods and we have seven."

What's The Big Idea?

Whatever mathematics is in the minds of junior high faculty, it is more like the views held by Central High than those held by elementary school teachers in River Acres. If the opportunity arose, seven or eight of the twelve teachers at Eastland would take a position in high school mathematics teaching. I found no one who would take an elementary mathematics position "given his druthers." Only one teacher requested sixth-grade mathematics teaching this fall.

Another teacher saw the big idea as the contribution math could make to a student's sense of personal competence.

> *The textbooks scatter across the field and diversify without the kids coming back to a core with which they feel comfortable. If the kids had mastery over a core of math then they [could] return to [it] so they could re-charge their batteries.*
>
> *(Another teacher suggested the same thing, drawing the parallel with our need to consume a quick, light, frothy novel on occasion because we want to read but not be taxed.)*
>
> *A child cannot do anything creative until the child has a competent feeling of mastery over something. A child goes to high school pretty scared about his competence. He feels he has had a smattering of everything and nothing really learned for sure. What we should be trying to achieve is a useful, productive, happy person who knows what he is trying to do.*

Before continuing with the Eastland teachers' and students' ideas of what math is, I think it important to share a faculty member's answer that came at the question obliquely when she said, "I don't know exactly what it is but the longer I teach it the less flexible I become."

A new teacher to the faculty, but one with several years experience, saw mathematics as training for "deducing the logic in words, in numbers, every day living." She feels the key to mathematics instruction is not in the direct solution of problems but in the student's approach to the problems. For many she feels it begins, and ends, with the introduction (to math).

> *Students are lacking in ability to read directions--all levels. Reading will panic most of our kids in math, even some of the zeros. If two sentences are given [written] to direct students in a mathematics problem, not more than two of thirty can go directly to the work. I don't have time to teach statement problems. We spend too much time on theory and not enough on statement problems in this curriculum. So we are losing a chance to develop a child's reasoning ability. Statement problems are the key.*

The two redundant themes in many Eastland teachers' discussions of what they thought mathematics was (and what they were trying to do in mathematics instruction) were improving reasoning ability and preparing for more mathematics. Recall the devastating comments of the "hard line" algebra teacher on what zero math was? Her conclusion was, "The only answer is in higher mathematics. There is no practical value other than that."

Notwithstanding that perspective, I find the Eastland students' views of what mathematics is to be instructive. They are drawn from three instructional levels.

Level 1 *Putting numbers together in different ways. Finding short cuts, learning how to use numbers.*

Level 2 *Nothing is hard about math. I get a B. I don't do good on the big test. Math is doing good work on the tests, big and little.*

Level 3 *I'm in level three. That means they won't teach us algebra. They will only teach us what we have already had. Math is learning over and over what you already know and keep forgetting.*

Note the responses were to the same question, "What is mathematics?" I repeated the question with other students and found other answers, to be sure. But the level one and three student responses were uniformly of the sort presented above, while the level two student responses were varied.

Help Wanted and Advice

The call for help was subdued in this faculty. One pointed to the strategy of a neighboring district to remedy reading skills.

A really progressive district like Arthur or Gordon [neighboring school districts] has teams at junior high school working on math, language arts, science, social studies, so the child gets the comprehensive help he needs. Instead of everyone complaining about how reading skills "do the learner in," they do something about it in math, in science. It should be tried at the sixth grade at the very least. We couldn't lose a thing. (Gordon school district has single grade [sixth] schools--an artifact of desegregation.)

I asked a math teacher of many years in River Acres where the greatest help was needed. "By average kids." It strikes him as odd that the advanced classes in mathematics are the ones with the smallest numbers and hence are more geared for individualization. These are presumably the kids with the fewer problems in learning mathematics.

The last plea came from students to their math teachers. Two in a group of level three students spoke up when I asked what "changes they [could] recommend to make mathematics learning better for them?"

At least give us something hard sometime and let those who know it or can figure it out show that they can. ["Could a teacher help with the hard stuff?" I asked.] Yes, no they can't; you either get it or you don't. When they explain it you either know it already or you can't get it, so it doesn't make that much difference. Give us more time and you teachers might be surprised.

The Great Mystery

I had several long conversations with one teacher. I shared my Great Mystery with him. He said people rarely remember anything they have no feeling about.

> *What does 75 + 83 do to a student? Nothing. It doesn't challenge him. It doesn't mean anything. The books in print in math are there for the sake of a math major or provide meaningless practice to kids who don't know anything to practice.*

Since I am organizing the telling of this story I have saved my pet for the end. This will be my last reference to the "Great Mystery." (It was not mentioned by social studies teachers nor by Central High teachers who will conclude my story.)

> *I have come to call this the "Eight-Year Plague" or "The 24-Hour Forgetting Disease." As best I can determine, it starts in the first grade and gets progressively worse over the eight years. It is endemic in the 3s, widespread in the 2s. Sometimes I think that's what a 1 is, someone without it. Okay, here's an example: I can teach a group how to use base two. We talk about it, do examples. They do it by themselves. Most of them have got it. They talk about it correctly, do the problems. Redo the problems, what else is there to do? The period ends. Oh, by doing it I mean adding and subtracting in base two. Change from base two to ten and back again. I am absolutely sure that about 50% have got it, and I think it is more like 60-70%. Two days later it is 10%. Now what in hell is going on? I talked about it with my educational psychology professor at the university and he says a lot of things about studies and retention/forgetting curves and meaning-imbedded instruction. Good for him. The problem doesn't change no matter what we do. We do everything the experts say. You're an expert from the university, do you have something I can use?*

I was my usual, helpful, professorial self and thanked him for the interview.

Eastland Junior High School Social Studies

The brief glimpse of the social studies curriculum at Eastland reflects the wish of its chairman. Since I did not formally observe instruction or interview faculty other than the chairman (at his request), I have not included students' acerbic views of social studies instruction and learning (which came through in discussions with them about mathematics and science teaching and learning).

The subject in the junior high that is regularly cheated in time and materials is the social studies, and it may be getting worse. The social studies is particularly vulnerable to broad forces which impact on the curriculum:

> *Students have gotten worse over eight years. The things kids need most in grown-up life they don't get. Reading and writing is [being] de-emphasized for taking time to explore, to browse through magazines. Students learn at any rate, and whatever he wants to. We have gotten away from getting down to the "Dick and Jane of things." The achievement tests don't show this, I've checked it, but I think 60% of our kids are two years behind in the junior highs. They are not able to read, in the social studies. Maybe our reading tests don't measure this.*

The social studies curriculum at Eastland is a textbook curriculum because "parents want and the district philosophy supports it."

The namby pamby stuff which results in loose, weak students. Seventh and eighth grades are in the ball park. [The solution is] basic geography, map reading, charts and graphs curriculum for the sixth grade.

The textbooks in use reflect a sprinkling of the social sciences and the faculty is moving slowly toward "having students dig out the facts instead of merely giving them to the students." There is no movement toward inquiry training, or the Taba curriculum which is seen as "a flop in both junior high schools."

The counselor provided an interesting addendum to the social studies chairperson's views when she said that, "Every social studies learning problem is at base a reading problem--not a content understanding problem." The bottom level social studies instruction does often take the form of a teacher first reading to the students, followed by a group discussion.

You can't win them all and this fragmentary break in the study is an instance of clear proof. When I found distinct reluctance on the part of the chairman to my interviewing his faculty and students, I backed off with the intention of returning later in the study when the "climate changed." I never returned.

There are times to observe and to not observe. It is like learning never to buy a pair of shoes in the morning. Well, I bought out of social studies at Eastland one morning in October. A rather weak bridge to transport us to the high school? The distance is short: let's go anyway.

CENTRAL HIGH SCHOOL

The end of the trail. Start with social studies. Kids are well dressed. Principal looks young and tough. No reefer smell anywhere on the grounds. Johns are clean! Corporal punishment policy in effect . . . crack, crack.

More first-impression jottings in my notebook. The principal did not turn out to be as young as I had thought, but the rest held up. The high school building is actually two separate buildings split by an auditorium. One wing houses the ninth and tenth grades pretty much, and the other the eleventh and twelfth. The three faculties studied in this report found this arrangement not to their liking. It tends to create an "upper-class and peons" feeling between the two subsections of each group.

I did very little in-class observing in the high school--only six classes, to be exact. It was pretty much a matter of time and personal choice at that juncture. The absence of open-space architecture made informal observations impossible. So I traded off five days of watching students and teachers for five days of further interviewing, with observing on an invitational basis only.

In 1971-72 Central had about 1,500 students. In 1976-77 it had over 3,300. Before that the school served a twin farm community roughly where Eastland and Westland Junior High Schools are now. The consolidation of 1959 was the first major change. Things really started to change in 1965 with the court order to integrate, and the beginning of major federal subsidies, and the out-migration of families from Houston. (See the introduction of this study for further demographic description.) For the past decade the retention of students has increased annually (for all races). This will be reported in detail.

The faculty is predominantly, almost exclusively, Texan. The administration and faculty for the most part claim they are "as well off as anyone could be in science, math and social studies, given our tremendous growth." The three faculties, teachers and administrators alike, share a common belief that their college training in the liberal arts is what is crucial to knowing how to teach the subject. The knowledge they revere and talk about is that subject knowledge one teaches with. There is little discussion about the knowledge the teacher may need to teach to pupils. "If you really know your geography (biology, trigonometry) you won't have any trouble teaching here--except for the kids who don't want to learn."

The change in school enrollment has brought obvious and subtle changes in the high school. There are proportionately fewer Mexican-American students (40% in 1965, 30% in 1971, 20% in 1977); and Blacks dropped from 20% to 15% to 10%. There are no more study halls, and a parallel policy which permits seniors to get "off-campus" the last period of the day is in effect. With each weekly increase in enrollment there is a corresponding increase in the felt need to manage the school. The high school staff and administration "give it our best shot." They do not have time or the personnel to step back and try to see what results seem to be associated with change. "We have no formal student data control system, or program evaluation effort," as one administrator put it. "In fact the data base we do have was created by the federal government's requirements." Federal data requirements result in the average, white student being the least-studied child in River Acres (in America?).

> *People count National Merit Scholars, Blacks, special education students, Latins, drop-outs, work-study students, what have you. The regular Anglo student is the "least-counted."*

The soaring numbers have brought about isolated but remarkable "last ditch" efforts to preserve contact with pupils in Central: e.g., a counselor uses next-quarter computer printouts of student schedules to exchange notes with her charges. "About 50% of them send me their messages. They know I read them and will respond." I checked through a stack of printouts and quickly found: "I may flunk this," and "I want to go to college now," and "I'll see you soon."

Meanwhile, Central High School patrons are seemingly confident of its quality program or are apathetic. A district official said:

> *Back in the early sixties everyone was examining the high school here. (James Conant was read by River Acres School Board members.) Now the emphasis here is on little kids. People seem to take the high school for granted.*

My informal survey of parents corroborates his view. There were notable exceptions, from a parent's distress with an aspect of her daughter's education to a parent of a small numerical minority that could be troublesome for the administration. One parent said she felt her daughter should not have been put in Algebra I (she failed it). The parent did not complain to the teacher or the administration but said, "It seems funny that every third student should fail a course if it was taught right." (I found that in one recent semester about 50% of the students failed the course!)

Another parent whose college-attending son had done very well in algebra at the high school said with considerable vehemence that the district wasn't being honest with them. He sneered at an item in the district's Handbook for Parents:

> *No child . . . should be required to work at a level for which he had not adequately acquired the skills necessary for successful achievement.*

"And one-third flunk!" (he exclaimed).

Another parent cornered me at an elementary school presentation one evening. He had children in Central and that school. He wanted to have his say on instructional levels. We had both witnessed a Christmas presentation in which hundreds of elementary-age students had participated.

> *In elementary school kids know their parents care. The flashing bulbs at the 137 Santa's elves; mothers driving them in early for teacher help; "What did you do at school today?" at supper.*
>
> *But what is there in high school if you aren't a cheerleader or athlete? What is there to take pictures of, or ask about, if you're [your offspring is] a level two or three student [in Central]?*

These were the odd cases. The high school has its problems, its detractors, its failures. But a vast majority of its participants and its patrons either don't think about it or think well of it. Next, a few observations about its teachers, followed by views of grouping, testing and grading, and some indicators of success, failure and student retention.

The Teachers

Until very recently Central teachers were not bothered by departmental or district evaluation of their work. They still aren't--but exceptions have made their mark. A few years ago a department head put several teachers who had been there for eight or nine years on probation. Two administration informants and one teacher said, "It 'worked' in that it got those teachers going" (or gone).

Teachers complain about the demeaning jobs of early morning hall duty or "potty patrol" and the sign-in (before 8:10 a.m.) and sign-out (after 3:45 p.m.) sheets. I sensed that one teacher had been waiting for someone to talk to for some time. He begins with behavioral objectives and ranges widely over his realities of high school teaching.

> *When does a teacher have time to write behavioral objectives? When does a teacher have time to really think about curriculum problems? A teacher doesn't have time to teach. I have never seen so many demeaning jobs, positions in my whole life. We spend no time together sharing ideas. I read so seldom in my field that it is terrible. Grading papers takes over 50% of my so-called free time. Student assistants could help file, alphabetize, score objective tests, create scoring distributions. How would you like to be fifty years old, with two professional degrees and have potty-patrol? Or sit out here and watch the door for thirty minutes every morning? Why should I come here ten minutes of eight to sit at a door? My wife has taught in several places. It is no different. My comments describe but are no criticism of this administration particularly. That's what teachers are supposed to do with their time.*

No one mentioned evaluation of their teaching or its consequences as troublesome. They do see themselves as models. "It's not so much what I say as what students see I am," a middle-aged male teacher offered. He and others are supported by River Acres policy in the Handbook, which emphasizes the teacher-as-model:

> *. . . instill in students respect for constituted authority; you should always greet your class at the door of your classroom . . . the habit is "catching"--they will observe and seldom be late themselves.*

The twin emphases on modeling good behavior and school as preparation-for-life come through in the Handbook's discussion of "Assembly Conduct":

> *. . . Take an opportunity to teach our students when to applaud, when not to applaud, when to be reverent, when to laugh. The necessary courtesies learned by our students now will remain with them as adults.*

If the teacher needs help in the form of supervision from the district, it will probably be unmet. The help must come from within oneself or from departmental colleagues. The latter will be discussed within the context of the science, mathematics and social studies curricula. Many of the teachers' problems in secondary are seen as the result of Texas certification requirements, not the particular subject curriculum. One district official said:

> *It [TEA certification] is the millstone around our necks. The requirements have little to do with the instructional problems confronting our staff. But you have to be certified, so you attend to those courses and let the world of Central roll on by. . . .*
>
> *[The district's policy on] supervision is "nowhere." The [school] board feels we have too many administrators. They fail to make the distinction between administration and teacher in-service help. This means curriculum construction and implementation is pretty much editing in the district office. No help goes to the classroom teacher directly.*

A survey was taken of the attitudes of teachers toward an in-service program provided by the district four months before I came to do this study. The questionnaire forms had not been scored when I left. "The data are getting cold. This is particularly troublesome in a district with the change going on as it is here."

Before turning to instructional levels I offer a personal conclusion drawn from my conversations with over 150 teachers and administrators in River Acres. Compared to the primary teacher, the secondary teacher is more sure about what she is doing, but is less satisfied with the results. Conversely, the primary teacher is less certain about what she is doing and how to achieve her goals. She is apt to be pleased with her results. In the handful of instances where I could listen to primary and secondary teachers talking with one another about school, this presumed difference was overlooked or not recognized.

Instructional Levels

I constructed an estimate of the levels for the senior class by counting the number of sections of the government course which all take. There is no top-level section; six sections of level two; eleven of level three; and four of level four. The senior class counselor felt that would exemplify the distribution for English and social studies as well.

Although figures are not available within the district, my distinct impression is that there is increasingly less movement between instructional levels as the River Acres students go up the grades. One elementary school counselor estimated that "30 to 40% of the children are re-grouped for something or another by the time they have reached the fifth grade." Conversely, a high school counselor estimated, "Not many [move from one level to another]: about a 5% maximum."

Any student requesting a move from level two to three or the reverse is honored. There can be no movement from or to levels one or four without the approval of the counselor. Behind every instructional level disagreement lurks either a basic reading or an arithmetic disability. The discussion may be cast in the language of science, or social studies, but it is usually the matter of what to do with the poor reader. From kindergarten through the twelfth grade, teachers agree: the student who is weak in reading is doomed to fail in River Acres. Two high school counselors said that, "There isn't much we can help anyone who cannot read by high school." The slow student who is trying may also be in trouble. By the teacher's own admission,

> *That kind of student I just don't know how to work with. Nor do I have the time. The quarter marches on, you know. So we give them more of the same, perhaps slower, perhaps louder; then when that doesn't work we just threaten them . . . and finally ignore them. Average teaching approaches just do not work with them.*

An administrator said it, but it was echoed by several high school teachers as a shared view: "The key to the whole thing is reading; and we cannot distinguish a student's inability from his lack of will to learn to read. The facts are students know they do not have to read to pass any course in our basic curriculum."

Tests and Grading

The formal standardized testing program in Central is comprehensive. For example, in the tenth grade the following areas are measured: science, math (computation and concepts), reading, vocabulary, spelling and language expression. How these are used in grouping students is not clear. They are used by counselors but very rarely by teachers. Since teacher judgment is a key factor in group placement, it would appear that the test scores are of little consequence for this purpose. The district also has initiated a minimum competence check in reading comprehension and mathematics for its seniors in response to Texas regulations. The tests take about three periods to administer. When I asked students what the tests were for and if it affected their graduation, none seemed to know: "Just something you gotta do." A few articulate students feel that the goals, while admirable, encourage an implementation policy which must be held questionable. (Several faculty agreed.)

The grading policy is most explicit, with a uniform point range associated with each letter grade.

99-100	A+	88-90	B	77-79	C-	69 & below	F
96-98	A	85-87	B-	75-76	D+		
93-95	A-	83-84	C+	72-74	D		
91-92	B+	80-82	C	70-71	D-		

A former high school teacher, now an administrator asks, "But who can say what a 73 is?"

Success and Failure

The college-bound student is the pride of the district. A counselor went to twenty-one government classes (all seniors) in the Fall of 1976. Among other information she obtained a glimpse of the college plans of the seniors. By level, she estimates that 85 to 90% of the one and two level students will go, 50% of the three level, and 10% of the four level. She felt these estimates represent lower limits and would not be surprised if more did go to college. She did not comment on the realistic appropriateness of the students' intents.

A social studies teacher did. (He had just finished a frustrating hour with a group of two level students who "did not care how historians validated their information.")

I say that the senior class has 10% college material, maximum! Sure 75% of them will go to college. That doesn't cut any mustard with me. We had a study a few years back [1972] that showed a lot of students who insisted on college prep programs never went to college.

Over fifty juniors scored 1,000 or more on the SAT this year and the district boasts five National Merit Scholars (PSAT 99th centile) and seven Commended Scholars (95th centile). The senior class counselor shared a most interesting story of "early identification of talent" with me. River Acres tested the present senior group as tenth graders and found 23 (of 820) with semi-finalist scores (99th centile). That group was placed into a major works English class as a group. On the basis of those scores, "We next considered an additional 402 students in that class as college-bound material."

In the eleventh grade the 402 students were retested (less those who had moved) and not one of that group joined the "top 23." Furthermore, the top 23 all achieved semi-finalist status again. Lastly, the top five stayed the top five! A last comment on test results quality indicators: 46 of the students in the senior class had SAT scores over 1,000.

An observer of the district for many years also saw the college-bound (intent or fact) student as, "very well served. That's our upper 50% at most, I'd say." The estimates ranged widely about the size of the college-bound group. One fly was added to the ointment of success by an ex-high school mathematics teacher.

The apparently successful 50% contains Pyrrhic victories. First, we have the student pushed into college that pays the price in personal anxiety, false expectations. Second, we know those who get good grades and think they know math and science because they have mastered the art of getting good grades in River Acres. They are rudely awakened in college.

One former Central science teacher challenged the "Pyrrhic victory" assertion: "For every kid that is pushed too much, there are two who are not challenged."

One night each fall, all Texas colleges are asked to send a representative to the high school. Each one that does come sets up a room and the students and parents shop the academic smorgasboard for information. They come to find that certain Texas institutions require more than others for admission. Texas A&M, for example, has a four-year English and a three-year math requirement. Others require three and two respectively. The University of Houston is among the lowest in its requirements fortunately, or unfortunately, according to your geographic perspective.

Students are failing in Central High School as they do everywhere. "Let's not deceive anybody by saying we give help to those who need it--because we don't. We give the help to those who cry 'Help!'" a high school social studies administrator argued. A long-time district employee, who works with vocational education math students, commented:

> *Kids are in high school today that would not have been there ten years ago. But the real loser never makes it out to the River Acres Career Center. Even if that kid does make it out here and gets skilled, that's not enough. Auto mechanics can't take kids who are asocial or unskilled with people.*

I had a brief conversation with the "minister of corporal punishment" in one wing of Central. He had some firm ideas about why kids fail and succeed and what the ninth grade means to many kids. The ninth grade means the driver's license first of all.

> *Without a car these kids are a nobody. The average group is a huge, smoldering problem. No place to excel, bored, frustrated, frightened. Smiling bravely down the hall to the next class. The scared ones pick too low a level. They can go to [levels] two or three on their own. [Need teachers' recommendation to go to either one or four.] Not a big problem, really. Boredom is aversive to most students regardless of level.*

The quarter system eases the pain of failure and allows sufficient curricular (scheduling) flexibility to provide remediation.

> *There is enough time in the schedule for teachers to grade tough and kids to fail but still graduate because of our quarter system. A hidden benefit in moving from semester to quarter system: [one can] flunk and graduate.*

One warm fall afternoon I approached a group of male students who had just fled from the "rent-a-cop" for smoking in the parking lot. They were near two sets of concrete steps which led to a building long since removed for use of another temporary site. I asked what "they" (steps) were. In the conversation that ensued one lad quipped: "That's the graduation steps for the dummies. They lead you right into the world." Ouch!!

Retention

Among my key informants in the high school were the counselors. Ironically, the better they do their job, the more suspect they were held in the eyes of some. "He wants kids to graduate, at any price. Do anything to get them out of here with a diploma in their hands."

I got too interested in the question of retention and student mobility in this sprawling district. As a result I got roped into doing some "real work" one afternoon in Central, poring through the records for the class of 1977. I started with the 750 students who began ninth grade at Central in 1973. By my count there were 588 left (or 78%). That surprised me. It was at variance with a majority of the teachers' beliefs. Most thought it was around 50%.

To these were added an in-migration of 76 in the tenth grade, 66 in the eleventh and another 66 in the twelfth. The picture is completed by departures, dropouts, leapouts, whatever: 140 left as tenth graders, 36 left between the end of the junior year and December 1976. (Three left the week I was in the office.)

While I visited the counselor's office I learned about an effort to help failing students graduate. The junior year is the most probable year a student will drop out (not leave the Houston area due to family relocation) of Central High. Students must be seventeen to drop out and seniors are motivated to "see it through." Just before the summer of the pre-senior year the senior counselor called forty "near-sure drop-outs" to suggest night school, correspondence courses, or contracts to make-up deficiencies which would assure class-of-1977 graduation. The results: twelve went to summer school, eight are presently on contract, and one went in the service and took the GED. That is batting .500, which can earn you the description of being a major league counselor or one who is "overly concerned with kids graduating from high school."

Central High School Science

Parents who were themselves high school students in River Acres would hardly recognize the high school science curriculum of today. In fact, the class of 1965 would find it unrecognizable, according to several of the old timers. As was indicated in the junior high discussion, in grades one through eight science was little more than "dead robins and magnets" fifteen years ago. One high school observer described these changes and more. He cited:

> *A major change over the years. Sixth-grade physical science is what we called general science in junior high twenty years ago. Our major problem is that science gets the kids over their heads in math so the teachers have to teach mathematics, too. They may or may not know how to do it. Another advancement is seventh-grade life science. It is as good or better than our high school biology was ten years ago.*
>
> *The mid-sixties found chemistry looking more and more like physics. Our first-line chemistry course is loaded with mathematics. Some teachers want to change our second year chemistry course to emphasize oceanography, for example. Parents say, "No"; they [students] need solid chemistry to get into and do well in college.*
>
> *This is true also for biology. Some of our teachers want to provide a sampler of "quick looks" into new areas for students in the form of mini-courses. Teachers want also to make second-year biology and chemistry more applied to social problems. Another related problem is trying to convince people that physics is so basic that a kid may need it as much as a second course in biology or chemistry. As a result, physics has never been heavily enrolled here. Another reason, of course, is that it is tough. Physics got "far out" because of a movement in Texas to put mechanics in physical science. Recently we have let up a bit in the physical science and physics courses. Earlier everyone was going to the moon. That's passed.*

It would be fair to say that the "good old days" in science instruction in River Acres never existed. The quality of instruction, the ability of the teachers and the students has been increasing steadily. Not many students went to college a decade ago; and those that did rarely achieved much in science. The present state science curriculum is not without its critics.

> *We require things in Texas that we don't really need (said an administrator). It is crazy to require two years of science when you don't need to. You are talking about a difficult thing [two years of science].*

The state requires that 60% of a science course be laboratory in nature, or approximately three of the five periods each week. The teachers say this cannot be met. Laboratory experiences are hampered by equipment failure, in a few cases by sections with too

many students, and by the realities of the time it takes to set labs up and break them down. "Successful experiments occur only when they are set up so students have no choice but to learn rather than just fool around." (Laboratory work necessitates students' being more on their own than does lecture, as a subsequent section will reveal.)

Somewhere between the apocryphal "good old days" and now, a personal touch with the student was lost, say some. One old science teacher bought a plant for each student to trim, prune, water, mix the soil; and even wrote a manual to accompany the work. He spoke nostalgically about the relationships that grew out of some of those student-plant-child relationships. One lad who began by seeing plants as "unmanly objects" ended with a different attitude: "That boy would have planted his pencil if he thought it would grow." He recalled being able to know which students had which plants. Now he can't tell you the students' names. He is nearly alone in his feelings--which in no way affects their poignancy.

During the early and mid-sixties parents were quite involved in the science curriculum, principally through the science fairs. Since the demise of the fairs around 1970, parents want to know only if the science curriculum "is keeping up with the current trends." On a rare and recent occasion a facet of the science curriculum, sexual reproduction, for example, has brought a parent to the district offices for administrative intervention.

Until four or five years ago immigrating Northern students were typically "ahead" of the River Acres students in physical science achievement at the high school level. This no longer appears to be the case. Indeed, the trend may have been reversed.

In the past two years new courses have been added to the science curriculum: marine science, environmental science, a second course in chemistry and physics. Curriculum experimentation in science does not characterize River Acres, but it has occurred. The story of the science shack presented in the elementary section is one example. Not all experiments have such positive results, though. Five years ago the district sent a group of students directly to high school biology from junior high school (bypassing physical science). Only the best students were selected. Two people independently described it as a failure. Apparently the students had problems in chemistry and physics with which the teachers were unable to cope. In addition, there are problems with the present system--but that comes later.

Most science teachers think that their science students who go on to Texas universities do well in their college courses in science. In chemistry, for example, teachers expect their students to skip the first semester course in college chemistry (if they get a B or better at Central in Chemistry II). The teacher, who offers Chemistry II also offers Physics II on an independent study basis on her own time, says that:

> *Freshmen in college come back--even C students--and say, "I am glad I had your course. It made chemistry or physics so easy." They knew everything even before they were were taught it in their college courses.*

(So much for the intent to proficiency those first courses in college.)

Reports are mixed about the relative-quality image of River Acres High School science with that of neighboring districts. Here are two teachers new to the district with quite differing views.

> *I've been in several districts and I don't know of any other one I'd work for. We have models, transparencies, overhead projectors. I'm pleased so far.*

> *Our district is far behind other adjoining districts.*

Similar judgments were found among other faculty, but the basis for the judgments were not clear to me. Changes recommended by teachers later in this section may yield clues.

Several of the teachers have master's degrees in science and the prevailing belief is that the incoming teachers are increasingly stronger in their science content background.

The Curriculum

Although the Texas state regulations neither prescribe nor recommend a sequence for high school science instruction, they do prescribe two years of science. River Acres' sequence is ninth-grade physical science and tenth-grade biology. The only prerequisites in the curriculum are Chemistry I before Chemistry II and Biology I before Biology II.

The state requires laboratories to comprise 60% of the secondary science courses. Chemistry II and Biology II are conducted seven periods per week with two of them offered one evening. The state requirements have been "under revision" propaedeutic to developing a state science "framework of mini-courses" for several years. One science specialist advised me "not to hold my breath waiting for its birth." Moreover, once born, "It will be administratively next to impossible to implement." (He sits on the state science committee.)

Instructional Materials

The textbooks are central to each course with the exception of the odd course where "a good one cannot be found." In marine biology the teacher uses stacks of magazines (Texas Wildlife, National Geographic) as her content source. My biases showed when I complimented her on doing a clever instructional job with them. She replied, "I wish I had a textbook. I would love to have a textbook. Do you know of a good one?"

One teacher in physical science who taught level 2s and 3s checked on the reading level of the text.

> *Some passages are at the seventh grade, which is a blessing; and some are at the tenth, eleventh and twelfth grades, which is damn folly. Most of them are up there. The problem is, it is about average on the list.*

The list to which she refers is the Texas Educational Agency's state textbook adoption list of five texts, from which districts can select one.

Two other physical science teachers declared they could use more than one text in their instruction (even if it were an "out-of-adoption text"). In general, they find that they need more things for the students to do than they currently have in the one textbook.

The sound films which the district owns and those available from Region IV are the subject of much teacher ridicule. This from the chemistry/physics teachers: "We cannot use them. They are a big disappointment--so out of date."

The "good ones" present another problem. They are such "best sellers" that everyone uses them.

Kids have seen that film I showed four times [about the structure of the atom]. I get irritated. They should never have seen that film. Half of them still can't understand it. [A similar story was told about films in biological science.]

The use of film strips in high school science instruction presents quite a different picture in River Acres. A biology teacher spoke for several others saying: "We use film strips a lot. Particularly with level four students. The kind that don't 'talk' are best." I saw a teacher using one set of filmstrips that had audio cassettes as part of the system --but she chose not to use them. I asked her why. "When we use the cassettes students often react as they do with 16mm sound films: Free Day!" As I watched and listened to her use of the non-sound filmstrips, I thought she made her point. The group was obviously orderly, attending to her presentation and the film, and asked content-specific questions about it afterward.

Another teacher, this one in physical science and in her first year in the district, after teaching seven years elsewhere, also saw the medium sending the students a message. "A filmstrip means instruction. A film means recreation. An overhead projector means no reading and a TV means, 'I must be at home'."

There is a district-wide problem associated with the maintenance (always repair--not preventative) of instructional hardware. Equipment such as laboratory microscopes, electronic devices, audio and visual recording devices, projectors, present a persistent problem. Estimates run as high as one quarter of the equipment being unusable.

I did not hear teachers or administrators complain widely about audio-visual services. Indeed, the increasing use of audiovisual materials in lieu of print materials was humorously censured by the superintendent in a staff meeting: "We have teachers returning from AV workshops who would rather laminate a hog than buy a pork manual."

The Students

Student interest in high school science is changing. Everyone agrees on that. But how, for what reasons and to what qualitative ends? I sense the potential for a useful study on such issues in River Acres. I have just scratched the surface. As one senior girl put it, "You're the kind of guy who feeds the juke box on your way out."

Upper-level Central science students describe themselves as being different from what River Acres has had in the past. (Nothing unusual about that. Don't all students think theirs is a unique group? And aren't they right?) The interesting thing is that teachers agree: "They are wilder." "The gap between the top and bottom is widening." "Central's average of today would have been our best eight years ago." "They are smarter and smart-aleckier." "They are more serious, more able . . ." These are fragments from unrelated conversations with teachers and administrators about Central students. Another one: "Kids know about genetic manipulation, problems involving science in society; ecology, germicidal warfare; far more."

I spoke with two members of the class of '76. They were excellent students in Central and are now freshmen at Texas universities. They reacted to several conflicting views of 1977 "New Crop" students positively. "They're all true!" "It depends on which classes,

levels, social groups you're thinking about." They said their Central High Biology II, chemistry and physics courses were "super." Biology I was recalled as "a course with low difficulty and obvious content."

The only and winning candidate for a poor (read that "rotten") course was physical science, where the content "was a repeat of elementary school ideas on a lower level." (Its teacher is no longer on the science faculty, they were delighted to point out.) Current level one students in physical science say they are "impatient to get to chemistry and physics without this 'Mickey Mouse'."

Other students saw Biology I as a bunch of "unrelated things that must be covered in a short period." They and their teacher independently describe the course as one in which you "run" from one thing to the next. Another Biology I teacher whom I did not observe teaching speaks:

> *It is like hoof and tails getting them to be interested in biology. But I finally struck gold today by reading from a book about how to raise your IQ: how a biologist and an educator view IQ.*

Students in courses other than biology complain about the rush of a quarter system and the slowness with which their papers (tests) are graded. Teachers defend themselves:

> *But that is because I don't care if John got the answer "5 Newton." Show me how you got the answer "5 Newton." So I grade set-up, procedure. Apt to happen more when the kid is in a higher level science or mathematics class.*

A physics teacher has been changing her course.

> *I have been building up my material from different textbooks for the last four years and I have reached my peak. I am not going to add any more. Classical physics is what I stress. They can see classical physics; these are things they can see, understand, draw a picture of. Modern physics leaves them out on a limb; quantum and relativity can't be seen, felt.*

Students and teachers are in considerable agreement about a slight margin of interest in science held by boys over girls. (I found no evidence for this in the elementary schools and an equivocal situation at the junior high.) Chemistry and physics are the outstanding examples where the course interest, achievement, and long term interest of boys apparently exceeds that of girls. Similarly, in biology:

> *Boys [are interested] a little more than girls in level four [Biology I] and finally by the time they get in a second-year biology it is considerable. For every four or five boys enrolled in Biology II there is one girl.*

The girls can be counted on to get slightly better grades "because they turn in assignments on time," or "do neat lab manuals." It's the boys who "lead" in the laboratory, as I shall report in the next section.

Before turning to the labs, I note the absence of Mexican-American and Black students in the upper-level sections and advanced courses in science. A retired teacher who was subbing in junior high science during my stay put it in an historical perspective:

> *Before 1974 they were all in special education: since then they have been phased into the regular program. They just can't read and the new words do "keep coming" in science. But it isn't only a matter of scientific terms. I once asked all the kids how many had ever been in a cave? Do you know what it smells like? Over 90%*

of my poor kids had never been underground at all. Never below ground level: think of it! Meanwhile a lot of my upper [social class] kids have rock collections, have visited mine shafts, have had more first-hand experiences than most of their teachers.

A current teacher of level four sections in science observes:

Mexican-Americans being in level four almost exclusively is not a result of prejudice. It is a self-examining proposition. They select themselves into it. It is their nature. Genetic, if you know what I mean. Not racist.

I asked a Chicana science teacher about this and she agreed. (There are many who would not.)

Laboratory Work

The things I saw and heard about laboratory work in high school science are presented in three themes: facets of the lab itself and the groups' size, purposes and instruction, and the behavior of students.

Group size truly seems to make a difference in high school science lab work. When there are twenty to twenty-four students in a lab things go much more smoothly than when there are a few more. (Some now have thirty-two students, with facilities for only eighteen.) It is a matter of equipment and space. The laboratories are well-equipped, scads of wall space, and have one microscope for two students. Some of the microscopes are new (electric) and some are old (natural light). This scarcity of resource (new ones) causes a management problem for the teacher. The microscopes caused additional crowding because of the need to be near electrical outlets. Care of equipment, especially for things like terraria in marine biology, is an increasing problem as the group gets larger. "There is no such thing as thirty kids taking care of anything."

Supplies are not a problem, chemical or organic. "We get all the sheep hearts and worms we need." Work on the eye and brain are avoided because it would deny certain children the laboratory experience because of religious convictions, according to one teacher.

The instructional purposes of lab work are an issue. First, there is general disagreement among teachers and students. Students want to "get in there and do it."

These kids think they should be able to just go into a lab and cut up a worm. Just cut him up. The steps and the reasons [for dissection] are not important. Just go to it.

I talked with kids as they came out of an earthworm dissection laboratory. They looked and said they felt "freer" in laboratory than they do in lecture. This feeling of freedom in a tight lab space (there were thirty-one in there) creates problems for the instructor. She told me she spends "too much time on such problems." Most teachers for one reason or another fall short of the required number of lab hours. One said she tries to get 20%. She does not think the purpose of laboratory work has really been thought through with sufficient care, and adds:

The great number of hours required <u>means</u> dissecting earthworms. What else is there to do? Many lab activities are personally offensive to many and of no interest to the majority.

Other teachers do laboratory work in their classrooms. "You don't have to go to a lab to jump up and down and measure the heartbeat." Another has the idea that field trips could be applied experiences to count as laboratory time, but the logistics defeat implementing her idea:

I have eighty students. I won't take more than twenty at a time. That means four trips to the beach. So I don't do it. Perhaps I could take the whole group to a shrimp hatchery. Maybe I could take them to the beach during the winter so they won't go into the water. Also, it has to be on Saturdays.

The third cluster of observations on laboratories are about the students themselves. After watching the girls read the laboratory procedures to their boy lab partners who then pin down the frog, I wondered if it was always thus.

Girls have "scoped" out their roles for sure. They are the housewife; Daddy is the doer. The boys do the step-by-step lab procedures based on what the girls read to them. And don't ever let on you know more than him.

A second female biology teacher agrees. "Boys are more interested and do more in laboratory work than do girls. In our drug work [applied stimulants and depressants to organisms] the boys lead the way."

There are wide-ranging differences in the effective use of laboratory time with level three and four students. Some teachers cite, "Fewer, not more, behavior problems in my labs with 4s."

I saw one level four lab of that teacher and there were no problems of note. But when it is bad . . .

When you go to a lab with a 4 [group] you have got a problem. It is better to do teacher demonstration. It is often better because you get the right results and they almost never do. They are so busy breaking beakers they never get anything completed anyway. So at the very least the teacher can show them how it does work if you do it right. Their attention span is so short they will be wandering off doing something else if you don't watch them closely. They'll really destroy your lab if you're not careful. Over 60% [of] level four are boys. Black kids get assigned to level four mostly because of a reading problem; next because of a math problem; next because of a discipline problem; and last because of a science problem.

Instructional Levels

Science instruction by levels is seen as a good thing and one which is working to the satisfaction of most students and teachers. The counselor speaks for most:

I am not [kidding] you. We have teachers who are fair, have high standards, are conscientious, and who are competent. I have my problems with them as a counselor but that much I grant them. I would feel bad about the levels if the teachers were not excellent. The levels are here to stay and I personally don't mind [having] them--nor do I question them at this point in time.

The reader should bear in mind when or if the mathematics and social studies sections are read that the counselor is talking about those teachers, too. Level one is referred to as "major works," and has about 5% of the students. Level two is "accelerated" and has

about 12%, level three is "average" and has about 70% and level four is "basic" (below average) and has about 12%. The advanced science courses Biology II and Chemistry II and physics are level one only.

The senior-class counselor has worked with the graduating class of 1977 since their entry to Central High School in 1973. She finds no "big failure problems" in science (as will be the case in mathematics).

Prestige is involved in being in Major Works. When you get into FOM in math it means two years--or the two-year "algebra" course. In science it is the same course and the levels mean slower pace but same content.

There is a debate about whether a level three in chemistry should exist. It is offered to "give college-bound students a chem course on their transcript" and all such students are recommended to take it. The teachers of such sections question whether it is "really chemistry" when the content is minimized, the mathematics is minimal and the coverage is foreshortened. A shared teacher view I found was, "the problem with chemistry is mathematics."

Students and faculty alike give high praise to the level one courses. Not all teachers want to teach level one, a departure from the junior-high story. "I'm glad I don't have a level one. I am learning with my students and am not trained in [this aspect of] science." (A majority of the faculty probably wish they have more level one or two courses.) A Biology II teacher of level one students surprised me when she said that the good students were not all that interested in biology.

They really put out because they want the grades. But they don't take that special care. They are busy socially. School is only <u>one</u> thing competing for their time. Some kids come to lab at night by taking two hours away from their jobs. Leave work at six, stay two hours, and go back to work. School for them has become something to work into their schedule. It is <u>not</u> their life work.

Biology II was offered for the first time in the school year of 1975-76. Now Central has several sections of it. Marine science and environmental biology courses have also been added recently. As we will discover in math, the science courses are generally regarded to be "better" by the faculty when they get "harder." The principal reason offered for this belief is that the better students and teachers are in these courses and the motivation is higher.

One place where the motivation is not high is level four. Teachers of level four and their charges told me in no uncertain terms that biology was not of great interest to the students. "The level three student will often tolerate details more so we teach more details to them." (The same text and curriculum are presented to the level three and four sections in science.) I did interview <u>one</u> biology teacher who claimed that she was doing a good job with level four students. I did not follow that lead and probably should have. One level four class I did see, and whose instructor I did talk with, "told it like I saw it."

Most are there because of discipline problems. And, most are there because of reading problems. Few are there because of conceptual difficulties in science. I have students who can answer the questions about the periodic chart. They know it. But I can't ask every one of them individually. I think there ought to be a reading class in every junior and senior high that you don't have to be in special education to get in. I have students from India, Mexico, Viet Nam, who need help in reading. They can't get it from me. Without exaggeration they could be in level one instead of the level four that they are in if they could get help with their language problems.

She said she expected no help to come from the district on the problems she is experiencing because "they have their own problems just keeping pace."

Regardless of the level, the shared goal of the students in science is "to get a good grade." Students in levels two, three or four (which have 95% of the students) do not say they are in physical science or biology to learn something substantive about the field. The reasons for getting good grades were several--but grades are the thing. Level one students did talk about science, about their interest in it--and about getting good grades. The competition for getting good grades appears to be considerable in the upper levels.

Compared to the junior high schools there is little discussion about misassignment to levels in science. I found references to misassignment, but always in the context of a more pressing problem.

> *Misassignment is detrimental in my teaching. With the size of classes mixing the levels would be disastrous. Teachers are human: we respond to students who listen to us and ignore the lazy and disruptive ones, even if that's unfair to them.*

The overriding characteristic of grouping students for science instruction in the ninth and tenth grades is its necessity.

> *I can't imagine having all levels of kids together. You couldn't do anything except bore the top two groups and go over the heads of the lower two groups while you taught for the mean. (Level three teacher)*

What's The Big Idea?

From time to time in this story I judge it useful to let the reader know what I think. This is one of those times. After watching a very few hours, listening for three days, and reading for several weeks, I was surprised to discover what the faculty thought the big ideas of science were and what they were about as science teachers.

I saw them teach and heard them talking with students about science as principal ideas with the facts that support those big ideas: concepts such as momentum, energy transformation, cellular differentiation, taxonomies, laws of conservation, probability and genetic coding.

But when I directly asked what the big ideas were, they used unexpected (for me) words. I expected them to stress science content heavily. Here is a sample of several teachers' and administrators' answers:

> *That's easy; understanding of self and the realtionsip of how things relate to him.*
>
> *They have to appreciate technology, not just understand it and see how to grab it and build on it.*
>
> *To do well in college science. It's as simple as that.*
>
> *To advance the culture and heritage through the use of expertise.*
>
> *To understand the issues related to the location of a nuclear energy plant, a land fill operation and a pollution-ecology debate.*

My big ideas are community disease, public health and recycling water courses. But what we do is probe sheep hearts and dissect earthworms.

The principal goal is to leave science with a favorable impression.

To prepare them for life ahead.

Drum into their heads that the scientific method can be applied to every situation in life.

The top of the pyramid. The place where all their math and science come together. (physics)

Are these harmonious? Does it make a difference what the teacher thinks the big idea is anyway? Would the faculty find a discussion of their list of big ideas instructive?

Two of my interviewees said a lot when one paused and said he couldn't answer the question; and the second said, "I haven't had time to think about that in a long, long time."

The Science Courses

The parts to this section are ordered to parallel the course sequence at Central. We begin with physical science (ninth grade), move to biology (tenth grade) and conclude with chemistry and physics (eleventh and twelfth). A majority of the science teaching faculty think biology should be offered in the ninth grade and physical science in the tenth. The reasons most commonly offered are ninth-grade algebra would be helpful in physical science; and the content of biology is "where the kids are" as freshmen.

Physical Science. The story in physical science is that it is a "bad news course" in the (unpublished) newspaper of students. Physical science is required of all ninth graders. The top-flight kids see it as short on challenge and the bottom-flight kids see it as useless or boring. The middle-flight prefer biology because it is easier or more interesting.

A chemistry teacher said that the physical science teachers are "the bad guys of our department." She says that part of the problem is the preparation of the students in junior high school.

What you find out first quarter is that "saturation," "solvency," "solution," "precipitation" really mean nothing to these kids. They have the names but not the concepts. They can argue about space travel but don't know what a planet is.

In the words of the chemistry/physics teacher, the same phenomenon occurs later when:

They know their radicals and oxidation numbers. It can make a difference but it usually does not, because they don't understand the things they have learned.

The summary description provided by four teachers of physical science was, "The lower the kid [instructional level], the lower the physical science interest." The lower level (average and below) students like biology much better than physical science.

They could care less about the three theories about how the earth came into being. That was past, the earth is already here; big deal! They don't see the atom. They do see birds. [No moral or ethical issue hinted at by kids at all.]

Another teacher of lower-level Biology I corroborates the picture provided by the physical science teachers:

The kids are more interested in biological science not because of the "humanistic interest hypothesis"--but because it is easier. More kids can relate quickly to biological sciences. Only a few can to the physical science.

I talked with two girls who were in chemistry level two because their parents said they "had to [be there]." They recalled their days in physical science and biology. "We spent about two weeks on that sheep heart and we spent about two weeks on electricity." The second girl agreed but also stressed how bored she was in physical science regardless of the content of the unit.

Biology. The biology teachers see the student interest in their required course a bit differently. They think their content is more directly useful in life for the young adolescent. Younger staff members emphasize the need to find links between the content and the lives of students. One veteran teacher agrees with the need to change.

When I started teaching biology I used to teach them the parts of the ear. Now I stress personal health, diseases of the ear, trauma induced by stereo blasting.

And the difference of being a year older is not to be taken lightly. Several teachers in the science department said that ninth graders were the problem--not the science course that was slotted there.

Another thing that biology has going for it is its breadth. Because it is a survey course, "You can always find something that you and kids like and give it a push." One teacher would have every teacher feature her "long suit."

We should spend a lot more time on genetics because that's where everything comes from in the first place. Every problem, any of your syndromes, mental diseases.

On the other hand we can see the breadth of the course as being its shortcoming.

Biology I is a survey course in [college] biology, that's what it is. It reminds me of my freshman biology class. I should hand them my old notes. We just cover everything and it is too much. Two days of lab leaves three days to read the whole field.

A final quote from a teacher who started to tell us about the increasing quality of her students and ended saying something else:

The kids are getting better and better in Biology I. They know how to do my tests. They know where I am going. Some of them have had me before. They can read me.

Chemistry and Physics. If you missed the quote near the end of a previous section on "What's the big idea in science?" here it is: "The top of the pyramid. The place where all their math and science come together." Physics is the elite course in the minds of the top science students, the counselors, the bottom students who will never take it and the instructors who offer it.

It is classical in content and approach. The modern physics curricula did not catch on in River Acres. This teacher has been building up her materials for instruction for the past four years. She has "raided several textbooks" in the process and is now satisfied with what she has on hand.

> *Classical physics is what I stress. They can see classical physics. There are demonstrations they can see, understand, draw a picture of. Modern physics leaves the student out on a conceptual limb. Quantum and relativity cannot be seen. And perhaps what is most important for the introduction of students to physics, they cannot feel them [quantum and relativity].*

I heard her teach a class for an hour while I worked in an adjoining room. She is an effective question poser. Works hard to get students to "think out loud" about physical relationships, about causation, about explanatory mechanisms. I also watched her work after school one night with a "last semester flunk" who is auditing her course this quarter. Socratic inquiry was obvious as she worked with the youngster. I asked her about giving Newton's laws, definitions, etc., without an experimental basis in the laboratory for kids to discover intuitions. The teacher said she knew about all that point of view but had rejected it.

> *Our whole science department is fed up with it [PSSC]. Investigation process wastes so much time. We end up telling them what they are looking for anyway; they cannot "pull it out." So I am putting my own course together and have developed my own materials.*

Her enrollments are up as they are in Chemistry. I asked the chairperson if the courses were getting easier and the students were sensing that?

> *It is not a "watering down" situation at all. If anything, the chemistry and physics are getting harder. The increase in numbers of students electing chemistry and physics is proportionate to the increase in enrollments.*

What is happening is the in-migration of students are principally from homes which are very much pro-chemistry. ("It is bringing you a better living.") One student said:

> *My father [chemical engineer] says that the United States is going to have to realize that we wouldn't have enough energy to even have a <u>shortage</u> if it weren't for the chemical industry. Not only that, physics is going to get America out of the energy crunch.*

Frequent, sporadic samples of students' attitudes toward chemistry and physics in the halls, lunchrooms, etc., found them generally positive and filled with the optimism of the student quoted above.

The attitudes are positive, and the worth of the course is not in contention; but at least one instructional problem in chemistry (and perhaps in physics) is apparent to three teachers. They spoke of the "mathematics trap" in Chemistry II as the principal undoing of some students. Students can "handle the science but the math is another thing."

> *Chem I the same: mathematics and reading is their bugaboo. Everyday math reasoning, the simplest functions they can't do. I can't explain it. There is not enough attention paid to application. They can hendle a polynomial but can't tell <u>what to do</u> with anything they know. They know their math. They want to be told <u>when to use</u> it. What do I do to solve this, Mrs. X? I can hardly wait to go back to plain math. The new math doesn't teach them how to do it.*

Science Teachers

There are strong opinions among this faculty about how teachers are trained--or should be trained.

> *Anybody who gets a degree in biology should have a course in genetics. Kids want to know why this kid over here has a big head. A Mongoloid. And we have one. Okay, explain to them and you need to know that there's a broken chromosome on the twenty-first to understand it. That's what science is. Why there is more retardation, more deformity that is now showing up? Explain brain damage.*

Another teacher of over five years in the district made this telling observation on staff selection for teaching high school science.

> *Loverly transcripts but poorly prepared in chemistry. Could run a class, maintain discipline. Lacked knowledge in chemistry. I promised myself that I was never going to take another education course. This [interview] is my one opportunity to scream; they are the most valueless courses in the whole world as far as I can tell. The only thing of value, and not much, was student teaching.*

A third, this one a biologist, broadly complimented Texas institutions of higher education for their efforts in teacher training and then pointed to an unaddressed aspect of her education.

> *I'm not as concerned with what to teach, or how to teach it, or how to order the curriculum as I am [with] how do students really learn science. That is going to be different from how students learn math, motor skills, other things. How do we get students to higher cognitive levels of synthesis, application? What kind of training do I need to get at this? Experience has not revealed that to me or to my colleagues.*

I would not be overstating the situation to say that the science faculty at Central High School in general thinks very little of the education courses they have taken; and if given the choice, few would take any in the future. The rare teacher mentioned anything about in-service training in the district and nothing congratulatory is in my notes on that score either. One teacher who works principally with level three students threw in a one-liner as she left one day that spoke reams about "the box" teachers are in. "Every day I try to squeeze in a few minutes to do some teaching."

Another science teacher says the enrollments have gone up, the courses are tougher and there's no problem with the parents. These have all been amply documented earlier. But he adds a special dimension:

> *In general, science has gone down over the past decade. We have changed the curriculum to try to adjust to this decline. In the 1960s I lectured, did everything "wrong" [according to comtemporary pedagogy] and my students loved it. High interest, high achievement. Now I am doing everything I know to recapture that interest. Changing my teaching, group discussions, student activities, films, kits. But it's gone, all gone.*

A personal review of the history of River Acres' science curriculum adds a comic touch:

> *Teachers, like most Americans, follow fads and change their minds. [In the sixties] we had labs with tables, sinks. We took them out, filled up the troughs with concrete. Two years later we brought the tables back, dug out the concrete, set up the labs again.*

One of the topics that one hears discussed among teachers trying to help one another is the "wild kids."

> *Kids are so wild. Including homeroom. Male teachers command more authority than do women 90% of the time. I would never survive without the support of the staff. Shared study sheets, tests, guides, materials. Level four means no discussion. So many anxious to erupt, disrupt. This bothers me that we can't discuss. Every teacher has told me that it is impossible to discuss things with this level. I feel guilty keeping them busy because I don't consider that good teaching. There should be a half and half.*

One new teacher (to the building) said she would have quit if it were not for the support of her colleagues during the first few weeks of her teaching. She also shared with me her view of an established teacher that went beyond perspective and skill:

> *The big difference between the established teacher and me is not expertise, insight or skill. It is the enromous backlog of materials, lessons that work, files that they can rely on to get them through the day or week.*

Another rookie said he was stunned by the "get ready" time involved in setting up labs. Sharing of lab space with other teachers makes setting up labs difficult to impossible for certain activities. So it all has to be done within one period. There are other worries, too: "Spend a lot of time getting labs together, taking roll, handing out papers, it's very frustrating. Students don't want to come in and get ready."

Before turning to the matter of how the science curriculum connects up to the junior high school and elementary science curriculum in the minds of students and faculty, I'll add an item on homework in science teaching. It is obvious that the laboratory component of science teaching does not lend itself easily to homework. In Central High several courses are reported to have no formal (assigned) homework at all. One physical science teacher paraphrases the situation:

> *I don't give it. My smart ones don't need it. Many have jobs and don't have time. Others won't do it. A few could profit. Which few is the question. By the time I figure that out the quarter is gone.*

Cross-grade Communication

The beginning ninth-grade student strolls into what (for science and mathematics) has been called "the crunch," "Death Valley," and the "Second World War in two weeks." Physical science and Algebra I are the villains and the play has several science faculty reviewers.

> *Junior high teachers teach at the incoming student. We aim at the end product. There's no tomorrow after us, for many of them.*
>
> *We expect our elementary teachers to do everything expert in all disciplines. Most are weak in math and science.*
>
> *There is no formal teaching of science before the sixth grade in River Acres [untrue]. Now really, they could start teaching science in the third grade.*
>
> *It all depends on who you start with, not what or when. Science teaching should begin with good, interested teachers--not in the first grade, or with physical science.*

Beginning science formal teaching is probably not efficient before the eighth grade. I could teach all the science they [ninth graders] know in three weeks. It is a sense of maturity, or the ability to handle data and to think logically about them. They just can't handle the whole process intellectually or emotionally before the junior high. Most of them can't.

The problem is they have gone over stuff. And over it. And over it. And never really know anything about it. But by the time they come to me [Biology I] they say, "We already had the cell!"

A former junior high science teacher now teaching at Central talked about how she did it "down there" two years ago:

The junior high goes too much in detail. [She was curriculum chairman.] We were not supposed to emphasize things that the high school taught. But the general science taught in junior high is exactly the same as we teach in physical science at the senior high ninth grade (physics) part of it. They should be doing the preparation for it. It is too hard for them in the eighth grade.

Students who are doing well in the ninth-grade physical science or tenth-grade biology ascribe their success in part to their junior high school teachers or to one elementary teacher who "made it fun" or "showed me how something worked for the first time." I was unable to get a student to recall precise concepts or discern a particular method of teaching science that could be associated with a success story. The failing students were nearly unanimous in their perception about how "we are never going to use any of this stuff"; and how "we know most of it but can't do well on the tests"; or "I never have liked science"; or how "I could learn it if I wanted to but there isn't any reason to, except to get a good grade, maybe." Not unexpectedly the courses and teachers were seen to be dull, or not to make sense, or not to be worth the effort.

While the successful student does not speak of the utility of the science courses in which she is currently excelling, her failing counterpart does speak to the lack of utility. Similarly, students who are highly successful in high school science at Central regularly point to an earlier experience that "turned them on," whereas their counterparts do not point to an adverse experience that "turned them off."

Help Wanted and Advice

Central High science teachers sent some strong messages to anyone who has a mind to read them. Those who attended NSF Institutes regard them, to the person, as the single most important influence on their professional development. Those younger teachers who have heard about them would like their chance. A retired junior high school coordinator who introduced a course in oceanography as a direct result of his attendance at an NSF Institute saw seven of his students (all boys) go on to colleges to study oceanography. (Two received degrees in marine science with a specialization in oceanography.)

The only untoward comment I heard throughout the litany of praise directed toward NSF Institutes took this form:

Frequently regular junior high school teachers demonstrated experiments to us and the kids [always introduced to us as a "regular eighth grade group of kids"] came up with the neat conclusions. I believe I was lied to at those Institutes. The techniques never did work out right back home. Wisconsin and Kentucky teachers said the same thing to me. It isn't the same back home. The deck was stacked somewhere. Teachers looked like they were doing things with the kids that they weren't maybe.

A young teacher needs help in the marine biology course she is teaching.

> *I would love to have training directly in marine biology. Now I have to take a lot of superficial courses because of state certification. None of them will help me. I'd really love to go to an NSF Institute. A major institution in Houston offers a course in the physics of oceanography and one course in marine biology. No other institutions have more than two courses, even though we are on the Gulf.*

Biology teachers had a couple suggestions regarding the content of Biology I:

> *We have to teach so much subject matter and don't have enough time to teach stuff they can really use. I'd like to eliminate botany and emphasize ecology. De-emphasize taxonomies and emphasize population genetics. The exams in the department won't let me. We also have accountability to the state.*

There was individual concern that the sophomore course was not "sufficiently demanding for our most able students." (Recall the River Acres graduates' descriptions of the course as being rather easy.)

A physics teacher was not making a recommendation when she described the problem that follows. I infer she was calling for help. It concerns the matter of how mathematics and science are (not) connected in the minds of her students. I offer it as the end of the science picture in River Acres and as a lead into teaching and learning mathematics in Central High School.

> *Mathematics they do in <u>that</u> building and science they do in <u>this</u> building and ne'er the twain shall meet. They just don't take the understandings they get in math and transfer them to physics. I know they are getting it over there. I have gone over and talked and seen what they are getting. They <u>are</u> getting it. I taught the students linear motion. We went through the whole theory of linear motion. We did linear motion on the horizontal. We did free fall problems. We did, I did problems of all kinds until they were coming out of their ears and they could work them fine. [For two weeks to three weeks.] Then I spent a week working on vectors, just vectors, nothing else. Early in the semester we had worked on right triangles. And I worked with vectors strictly on the right triangle method. Well, they got the linear motion equation, they got vectors okay and we got to projectiles and they went "AAAGGH"! They didn't know what to do. It was something foreign to them. All it was was putting together the linear motion with the vectors. I would say 75% absolutely could not put them together. 75%! They knew <u>everything</u>. I can give them a vector and they can break it into the components. I can give them a linear motion problem and they can do it. Free fall, horizontal. But if I give them a projectile, something rolling off a desk they don't know what to do with it. I had an overhead projector with a transparency and spent a whole period and showed how it fell, okay. I had everything set up perfectly. And I had something shot upward; the velocity before it hit and the velocity as it shot upward, then I overlaid them, going up, coming down, same thing. And then I put the projectile over there and showed them that the projectile in the Y direction happened just as if you dropped it. And then in the X direction for every interval of time it moved with a constant velocity and it went in one ear and out the other for three out of four. [I gave them a test.] As soon as I gave them their test back and I said, "okay now let's do these together," everyone went, "Oh, is that what you wanted?" I had done several before the test. Now they know how to do projectiles, no problem. Good students. It's weird. What they want is a nice neat formula to plug in.*

Central High School Mathematics

Kids are struggling with algebra in our schools today that would not have taken it at all ten years back. There is a growing pressure to feed the kids to the next course. It is all wrapped up with the cumulative nature of mathematics that is in no other school subject. Sports, music have it, but they aren't required. Take science and social studies, for instance. Teachers in geography don't have to feed kids into history; or teachers in physical science don't feed kids into biology. Kids take different courses in those curricula and while good students in social studies and science tend to do well in social studies and science, there is no finger pointing or parental hue and cry if they do not. But once a kid breaks down along the mathematics trail, it's all over and everybody knows it.

An administrator said it, but almost any River Acres math teacher would agree with much of it. The Texas guidelines say a senior high school must require at least six quarters (two years) of mathematics of its students. Thus, River Acres far exceeds the state's minimum requirements in mathematics. In the ninth grade students take either fundamentals of mathematics (FOM) or introductory algebra (IA) or Algebra I (ALG). The choice is important in that it determines a student's mathematics course for the next year as well.

In a real sense that assignment controls the mathematics curriculum for 95% of the students for their entire four years in Central. The students' career choice is made in the tenth grade. Counselors know some students make it unwittingly. Which courses and which levels cast the die. The distinction is this. FOM is a two-year sequence which reviews basic arithmetic. IA is also a two-year sequence in which the first year of algebra is "watered down" and is spread over two years. ALG is a three-quarter (one year) course based on the Dolciani series.

The tenth grade has a geometry course, which follows the Algebra I. The eleventh grade offering is ALG-II with computer science: a "major works program." The twelfth grade is trigonometry and introductory analysis and the calculus. There is also a liberal arts geometry and a liberal arts ALG-II which serve students who are college bound, but who will not require more mathematics in their vocation. It essentially enables them to meet college entrance requirements while taking a terminal course. The computer science laboratory is available but minimally-used by a handful of advanced students.

Algebra I

ALG-I is "the killer-diller"; "that damned course"; and "something I'm awfully proud of," depending on your informant. I visited a class, looked at the text, talked with several of its teachers and students and found it unremarkable. The teaching approach, the content, the exercises are what one expects to find in a pre-college algebra course.

But 50% of the students fail it. For many of the students who fail, it is the first time in their school lives they have failed a subject. "Social promotion's got to end somewhere," observes a young teacher. "The problem is it takes them down in other subjects," a counselor claims. The teachers say the problem is in the junior high school testing and placement programs, not in the high-school instruction. They see that many of the ALG-I students are rated more highly than they should be.

A lot of students are in ALG because their parents want them to have that status symbol. Some would be ready by their sophomore year but are immature when the choice has to be made. Our recommendations are overlooked or overruled.

Another teacher adds that there is a student expectancy that contributes to his undoing.

> *Kids come into the class [ALG-I] in the ninth grade with a "right answer" orientation. What I spend a lot of time on is process. I mean I grade on the steps they use to get to my answer. They are dumbfounded.*

The students and parents are not storming the faculty gates on the matter. In fact, the greatest concern is expressed by, not about, the faculty. For students who make it past ALG-I, it is clear sailing.

Algebra II "used to be a boys' course" recalls a teacher of many years. "In fact twenty years ago it was four boys to every girl." Now it is elected equally by boys and girls. If there is a trend, it is in the direction of more girls electing it. But this is tricky to interpret since ALG-II has three levels. Level one is for the very top student. Computer science is integrated within the course. Level two is for the college bound who could take more math but are not likely. And level three (the liberal arts section) is for college-bound students who are not talented in the math area. Trend data for the ALG-II levels do not exist.

Fundamentals of Mathematics (FOM)

FOM is a terminal, two-year review of basic mathematics. It attracts a wide ability range of students. I watched a student in FOM level do a problem which called for the division of 51 by 3. He made seventeen marks and then counted them: 3+3+3 etc., and got there. In the same class I saw a student finish the assigned problems in less than ten minutes and spend twenty minutes talking with a neighbor. (His answers were correct.) For the most part the FOM student is weak in skills.

> *They don't know the vocabulary of mathematics. They don't know when you have 4 divided by 2 which number is on the outside and which is on the inside. But they really know their set theory. I think it is terrible. It is a tragedy; I really do.*

Introductory Algebra (IA)

Introductory algebra is the most maligned course in the mathematics curriculum. It exists as a "transcript course" to aid mathematically-inept River Acres students who need algebra on their record to gain college entrance.

> *Big push for everybody to go to college after high school accounts for a preposterous course such as IA. It is the state's "fault." The trend.*

Several students currently in IA told me that, "We are not getting a thing out of it"; that "It is boring and has no use"; and that, "It is okay because you have to have it [to get into college]." Not very high praise. But the teachers go them one better:

> *The two-year algebra course and lower level geometry [students] are really getting a junior or slow math course and call it algebra and geometry. There is no pay off for anyone beyond deceit. Students who do well in them have a difficult time in chemistry with mass: mass problems which are nothing more than junior high school ratio: proportion problems. We don't have enough level two students in the real algebra [one year] course. More marginal kids should be put in there. Half the kids in the two-year watered-down algebra and I want them there. They coast in class, are consumed by social problems and coast out of class. If they were really working at something their problems would be lessened all around.*

Geometry and Trigonometry

Geometry and trigonometry are courses that have the function, in part, of "getting them into college." About four years ago River Acres students were having trouble making it through the required geometry course. The decision was made to

> *. . . stress the verbal rather than the computational. It is a state-approved course and includes the history of mathematics. I had to develop the program and it is very difficult to develop a program you don't believe in. Then we were told to put level geometry on the computer, which was a disaster. These kids couldn't possibly go to college. It is a farce. Except that the college standards are getting lower every year so maybe they will make it.*

I asked a level three geometry teacher who said her section was doing "pretty well this quarter," if mathematics was either hard or boring for her students.

> *I have students who have absolutely no reasoning at all. They go to the kitchen and start to bake a cake and half way through they make spaghetti, if you get my meaning. For the student like that, mathematics is hard and boring.*

Again, it is crucial that one understands the level of the course the student is taking or the teacher is teaching. If one is discussing a level three geometry course then one is describing an element in a three-course sequence of Algebra 3 and Trigonometry 3 as well. There is no student choice in that sequence. (There could be switching between levels one and two, however.) It is of the "liberal arts level three" sections that the faculty contentiousness exists regarding these courses.

Math Analysis, Computer Science and The Calculus

Courses such as math analysis, computer science and the calculus are in a sense "liberal arts" sections and are generally praised highly by the teachers and the students. They are tough courses and the teachers are demanding. One morning I heard the following in a math analysis class (from a teacher whom the students and colleagues regard as a fine teacher):

> *Can't you people read?! Why don't you drop math analysis! It is going to get pickier and pickier as we go along [second week of the quarter]. You are going to have to learn the language and read it. If you say "onto" I don't know what you mean . . . what you know. There is only one way to write a definition; it is in your book. This is not a class in creativity; it's a class in clear thinking. In logic. I don't care if you have a personal definition. Do you know the definition that is mathematical? That's the question [shouts it]. You have a definition, she has a second one, he has a third. Mathematics cannot proceed in this way. You will get credit only if you write down the correct definition.*

A teacher shared her idea of what a mathematics analysis class should be in the context of describing some of her students who "shouldn't be there."

> *Can take his facts, translate them into mathematics symbols, and build a model to fit the facts. My students say their pre-calc course in college is a breeze. We introduce matrices in a couple weeks. We spend a lot of time on analytical geometry. We have kids in there who are there only because mom and dad push. They shouldn't be there.*

The calculus means that the student is in level one "major works" and is at least in the top 5% of his class. There are three routes for a student to end up with the cream of the crop: first, the student comes from the "zero group" in junior high; second, geometry is

taken in summer school; or third, Geometry II and ALG-II are taken concurrently in the sophomore year. Whichever the route taken, the results are apparently the same: success. "A vast majority of the students who make it to calc pass it."

A word about computer science before turning to the instructional materials used in Central High mathematics. Computer science, like calculus, is alive and well if not growing. About six years ago there was one calculus class and there still is. Computer mathematics courses are never larger than ten students. Typically it is a "boys" course. Due to the small enrollment it is an independent study course, by teacher approval. "Since I am not there to supervise them [the terminal is located in another building], I do not approve very many." (The quarter I observed there were six students.) I learned of a "saved soul" that was attributable to the course.

I got a near drop-out hooked on a computer and kept him in school. Eventually, he went to college and is in architecture, winning honors.

Instructional Materials in Mathematics

Mathematics instruction focuses on the textbook. Very little audio-visual is used and this is by teacher choice. For example, the use of hand-held calculators in school is forbidden for all except the top 5%.

College professors are standing up and advocating it. I think they had better think again. I do not allow it except in trig or analysis, where by that time they know their basics or they have faked a lot of people out. You waste more time doing arithmetic than doing the trig so they are allowed to use them there.

A sample of the variety of reasons which teachers give for not supplementing the text follows. One River Acres teacher was involved in producing Texas television tapes for teaching high school math and doesn't use them:

Good time killers [she says]. I find that it is very hard for me to use these little neat gimmicks because I stay so busy trying to get them to work the problem. I did used to run a math lab in a different district where we used individual instruction on the students' own time. Tape cassettes, extra notebooks, overheads, in a one-to-one situation. But I want that personal contact with the students.

If I put more effort into it I believe I could find them [visual aids]. I just have never used them.

Textbook and blackboard and I'll tell you why. I hate to think of it like this but I hate to take a day out to show them a film. Films mean fun. Fun means nothing to learn. And that means a loss of a day. Then we don't get what we are expected [to do] finished.

I'm not as good as I ought to be about using AV aids. I do a lot of drawing, demonstrating on the board. Colored chalk. I quiz them a lot on what they read. Make them read. They just don't know how to read a math book.

I wrote up the geometry section on filmstrips [Curriculum Guide] and films but I've never used them. I do use the overhead.

It is only the most personal hunch, but I believe the next story may be vital to understanding one dimension of River Acres. It reflects a fundamental view of inferiority held by the teller. How widespread, and how important it is for this story cannot be said. Because it was the only one of its kind I almost left it out. Indeed, it was the last entry made in the writing of this study:

> *I went to about six NSF scholarships in the summer. In fact I was offered one at the University of Illinois and they had a really good program. This was before the mid-sixties. There was all this emphasis on modern math. This was to be a crash program and I think we are still suffering from this. Teachers had to be retrained. It all looked good on paper. But to get in it and teach it was something else again. Let's take the student. An eighth grader had to be quite mature to handle the texts written for Algebra I. In Texas we use the Dolciani textbooks. About 85% of our schools used her series. I studied under her at Hunter College, by the way. It was a tremendous program.*
>
> *But the material is hard for our ninth graders. [It is intended for eighth.] You see here in the South I do not think we can take a book written by an Easterner and make our people handle it in the eighth grade. Now, we can handle it in the ninth grade--but how many [students] can? What percent? My guess [is] about 50% of our students can do it. It depends on what kind of people you have.*
>
> *Now that we have an influx of people moving in from the East maybe they will fit into this program.*

Teachers are not delighted with the textbooks they use. Specific shortcomings were noted by two teachers.

> *In general [elementary analysis, trig] certain concepts--nice, pretty things happen with them, but that's it--like absolute values and inequalities, are way overemphasized. Textbooks just don't have anywhere near enough examples, practical applications.*
>
> *Another example is the section on factoring. A big topic. Covered in three pages. Sixty-six problems thrown in together. We can't even use it. I have told my kids not to bring in their books for the next ten days. This will be the last thing I do with them. After ten days' work I'll give them this assignment.*

The purpose of IA is challenged by one new teacher in his comment on the IA text:

> *IA--don't like it. Should take the same ALG-I book and teach it in two years. The only modification would be to eliminate proofs. In IA you only get through tri-nomials, factoring, multiplying bi-nomials. You never get to rational expressions, nothing about irrational numbers [square roots, cube roots] and nothing about quadratic formulae. They will go to college unable to solve a quadratic equation.*

FOM texts are low on practice items, according to a third-year teacher.

> *One or two examples on percent. One or two on ratio and proportions. The deemphasis of percentage in the curriculum is downright dangerous. Many FOM students do better than ALG-II students.*

The geometry text for the level two students (used also with the level three students) was generally praised, as were the Algebra I and II texts with the sole demur that they may be "too theoretically abstract for some students." This and the lack of practice items and practical application items are the dominant criticisms of the math texts.

Concern about how these texts came to be used in River Acres was expressed by a few teachers. Teachers feel that textbook adoptions come too early and too late.

Why is it so frequent? I think what happens is that people write them and push them and that's why we have to re-select every six years. Not because we need to for mathematics.

Once we get it, we are stuck for six years. I think we should have a trial year, or quarter at least, before adoption.

The problem of selection is one that is felt deeply by a small group of the teachers. They see its roots in the publishing industry.

There aren't any good probability books for kids. Publishers ran through their college texts and threw together high school texts for the state adoption list.

A lot of the stuff put in high school mathematics books is not useful; it's trash, not helpful. The selection at the state board level just could not involve trying out these materials in their own minds. They gave us three choices. So we chose the new edition of something we had already found to be terrible. I don't see how they could even have considered the other two books as algebra books.

Cross-grade Communication

High school mathematics teachers do not share the desire expressed by their colleagues in the junior high and elementary schools for cross-grade communication. The high school teacher agrees it is not emphasized "in practice as much as it is on paper" in River Acres, but is not sure that is a bad thing necessarily. An extremely frank comment from a second-year teacher was:

I don't have to try to communicate with my elementary colleagues--I sat with them in the teacher education courses two years ago at the university. I know they don't know mathematics.

Other teachers want an emphasis on the basic facts even if elementary teachers were uniformly high in mathematical ability.

I wish they were almost taught no theory down there. Back to basics. That means delaying teaching of theory.

No algebra should be taught in junior high. Fortunately nature is on my side in that very little [algebra] can be taught in junior high. Verbal trappings for sure. Understanding almost never. And I know all about the super-zero students.

A teacher of several years at Central recalled attempts of many years ago (early sixties) and prophesies the future.

Fifteen years ago we tried to enrich quick thinkers, not move them ahead in formal mathematics. Then we got into madness where everyone had to have algebra. But it became very apparent early that most of the kids could not "get it." So to get them in college we started giving higher grades, and creating algebra courses that weren't and aren't algebra. We now have arrived at a curriculum that produces A and B algebra students that get crushed in college mathematics. We reflect society. Now that the societal math/science panic is over we will nestle back to a more substantial mathematics curriculum for fewer students. Also we will get more rote learning back in the curriculum. Youngsters will be asked to add/subtract/multiply/divide without a calculator. So, they will know basic processes before they go into teaching them functions in the sixth grade, when they still can't add fractions

or decimals. Another implication is for teacher training in elementary school. The elementary teacher needs to know what the child is heading toward; math analysis, trig, calculus, second-year algebra, so that this [elementary school] year makes long-term sense to them. So they can tell where a child is heading in his mathematical thinking.

An effort to bring the elementary, junior and senior high mathematics teachers together was made in recent history. One who attended the meeting said:

We had the [articulation] meeting in October of 1975. We discussed where our problems lay. And we have heard nothing since then. We need to know more as they do. The administration has not followed up on it.

Most of the expressed concern focuses on the junior high school mathematics curriculum and instruction.

For some reason in this district [I've been in three school districts and this is the worst one on this count] the kids coming into the ninth grade are not as well prepared as they should be.

The shift away from basic facts; the trend toward earlier and earlier introduction of abstract mathematics; it's not poor teaching.

Fifty percent of my classes had been taught that you divide, get the whole number and precede the remainder with a decimal. It cropped up everywhere. We took a survey, found out the kids that did it, found out where they had learned it. It was like we had to set up a disease control center and track it down. Came from two math teachers in junior high school--both are gone, fortunately. But their virus lingered on.

Teachers and administrators see other barriers to improving articulation (if indeed, it is desirable):

As long as you run a school on a "no child can flunk" basis, all kinds of deceitful grading practices will occur. Before the ninth grade the [letter] grades don't count. So our ninth grade comes as a shock.

Instructional Levels

This raging issue in the minds of a few teachers and administrators was quelled in Central High mathematics: levels are necessary and good. "A few students are misplaced" (estimates ranged from one to five in a class of thirty-two), and the level four students are believed by about half the faculty to need an improved curriculum. But the issue is not whether there should be a level four, or whether the students belong in that level.

Several teachers reported their level four students to have "given up," but the level three student is ofter described as "lazy." "Ninety-five percent of them could do level two work," observed an FOM teacher of three years with several level three students.

In addition to the widespread observation by teachers (and by level four students themselves) that reading is a problem in mathematics, teachers say students are unable to "stay with it" during a period of instruction.

Especially for the 4s you can get a little bit done at the blackboard and then you had better get your handouts out real quick. Level 4s need the materials the most and you can't use the materials you know they could benef t from. It's too bad.

All in all, the "good probably outweighs the bad."

Best students can be more readily challenged. Weakest could be worked with more easily, too. From the teacher's standpoint homogeneous groups are good. [I'm] not sure from the student's standpoint.

Once the ninth grader is settled in a track they pretty much stay there from then on. Even when changes are necessary the schedule may not permit it.

Concept is good; the weaknesses come in when students are misleveled; when parents intervene; when classes are filled above or below so we can't re-level a student. If they flunk the first quarter of a math course they are not supposed to go on to the next quarter in Texas.

A young staff member combined his view of the necessity for levels with the open-space idea. (Open space was mentioned only one other time in passing.)

You have got to break it somewhere. But how to decide that this guy is going to take ALG-I and this guy is going to take IA is hard. There is a large group of kids who could go either way. I have always said I never wanted to teach in an open-area concept when there is no leveling and everyone works at their own rate. But in a way I like that idea because I can see the possibility of reaching more kids. My idea is to have part of it closed. Take a group into a closed room, lecture, demonstrate--then go back into the open area for practice, resources and let them work at their own rate. Then you could see each student's needs.

Teachers and Teaching

I am a very traditional teacher. I use chalkboard, a textbook and handouts.

If half the faculty did not say this precisely, they came close. I believe it is a fair representation of the faculty's pedagogical style. Another characteristic is "staying with it." The major works and level-two sections are on-task, no-nonsense experiences according to teachers and students. The only verified instances of non-instruction were with level four sections; e.g., I noted students standing around joking in one math classroom for over ten minutes. Students described one class as a "nothing course." All informants and my experience say that is exceptional and that a vast majority of the teaching is tough, demanding, persistent.

Administrators and counselors say teachers in general do not for the most part utilize or know how to obtain information about their students from the standardized tests given. Teachers say the information is not useful. They say it does not aid in instruction because it tells them nothing they did not already know after two weeks of instruction and in no way implies how to remedy deficiencies that they already knew existed.

A mathematics teacher who taught several years of high school science before joining the River Acres faculty as a mathematics teacher stunned me at the soft drink machine one morning.

I talked last night to my wife about your interview and we wondered what you think about this. Since it is common knowledge that most students will not understand nor appreciate . . . nor just plain like mathematics by the end of the junior high school, what kind of a person consciously selects a teaching career in mathematics in the high school?

I don't want to think about that. The split faculty and split resources due to the double-building school plant are troublesome for the department head.

> *Building arrangement is maddening. Can't keep in touch. Supervision cut back. Divisional organization is imperative. Assistant department heads become very important in subject areas. Of the four areas, one is going very well [ALG, FOM/IA, GEOM, CALC]. Almost no time to pay to total curriculum.*

Scheduling is monitored carefully. For example, geometry and algebra are taught so everyone tests on the same day, the same content. Never more than a period ahead or behind the other section(s). The schedule also affects the teacher's approach. It results in keeping all sections together. Faculty approve of it for students' transfer sake; disapprove of it because it limits instructional flexibility and opportunism. "Wednesday is test day and your kids won't be ready for the departmental content if you are too individualistic."

An identical testing plan to that in the junior high schools is followed with one day a week designated for departmental testing. A less-than-perfect computerized schedule brought the wrath of one.

> *We have a computer program with scheduling problems. I don't think we are getting our money's worth. A good programmer and program could tell us where in the curriculum during a certain time someone was doing division of decimals. Then if you had a kid in trouble with that he could go into that section just for that skill development--then return to his course. But everyone throws up their hands and says "oh, that's too much of a scheduling problem." Others have figured it out. What's our problem?*

The life of the mathematics teacher is not necessarily easy in a school when the upper levels of algebra have high failure and the lower levels of IA and FOM are filled with students who could not care less about school mathematics.

> *The teachers get to the point where they don't want to rock the boat. [But] the sea wears the rock and they finally give in to the need for student love. It's no fun being called a tough bitch year after year. Some day nearly every mathematics teacher has to give in or give up, I would suppose.*
>
> *The administration wants things to look good on paper. All A's mean fine tobacco.*

The kind of group support to be described next in the social studies section was not in widespread evidence in the mathematics department. Some faculty felt "that is par for math teachers." Two teachers in one section, however, did report sharing materials, tests and ideas in their section.

An interesting fact of instructional life was mentioned by two math teachers. They said that men teachers tended to receive lower-level class assignments to lessen discipline problems. "My comment to the ladies is if you want to be a teacher, start sticking your neck out," advises a middle-aged male teacher. Others verified the assertion that male teachers do have fewer discipline problems in mathematics teaching at Central. An additional and related item is that there is a seniority system in effect with the more senior staff more likely to receive their course preferences: "You work your way slowly to the top" are the words of a relatively new teacher.

When you get to the top and look back, as did one teacher of excellent repute, you may take pride in your relationships with students.

I'm proudest of the rapport I have maintained over the twenty years I have taught. If I won't learn anything this year then I should quit. Mathematics is dry--but kids can enjoy a class or a course.

She said "dry," others say "dead," most say "boring." The pedagogical complement to student boredom is repetition--but it is necessary. One teacher confided she went into math education because she found it "unnecessarily hard and boring as a student."

Hard and boring. That's why I got into math. Trying how to figure out how to make it not boring. I have been disillusioned. It is a drag.

Another describes student boredom as a natural event.

I'd have to put "boring" first. The subject matter is hard for an awful lot of the students. In my [top level] ALG class yesterday the first presentation [to thirty-three kids], fifteen of them [snaps her fingers] got it. Now they are going to be bored while I work to pick up the rest. [Two days on the binomial!]

Others disagree that math is necessarily boring. One, a young male teacher, analyzed it this way.

The less able the student, the more likely math is to be boring. It is that simple. Think about it. It gets to be boring when something never makes sense to you and it keeps coming at you and coming at you. It also gets to be hard when you never get the right answer. Able students find mathematics sensible and because they do work at it and get the right answer rather often, which in turn increases the sensibility. It's a tautology--but it's a factual one.

The joy of teaching came through a conversation with an upper level senior mathematics class teacher.

When some of my students raise their hands I know I am going to learn something. When they say, "What if . . ." I know I am in trouble. And that is exciting. When they say, "I need some help," I know I am going to have to think or study a little more myself. The challenge of the less able student is to get them to see the wonder of mathematics. To see the puzzle. To catch the excitement.

The agony of trying and not succeeding was in the observation of a younger geometry (liberal arts) teacher who had tried to be inventive in his approach a few years earlier. He now puts

. . . less emphasis on algebraic proofs. Too much [for work of teacher], too little return at freshman level. Less emphasis on creative stuff; we had them on a computer, had them doing papers on the history of math. We cut out all these things over the past three years as a waste of time. They couldn't do a geometric proof after they wrote their papers, did their macrame, worked on geometric problems on the computer. They could not understand; they did not have the logic.

The puzzlement of what works today but may never again is described:

When the light goes on for a kid I ask, "What did I just say? Tell me, so I can use it next period." It doesn't work next period, of course. Today we were doing the expansion of binomials. We had done the usual background work on this. So I was giving them Pascal's triangle and some of them caught that rhythm just as soon as I put it down. Others were saying what, hey, where are those numbers coming from? So, we work on it together and alone. We lost some of them and came back and did some more--then one said, "Oh, I get it!" Then a couple others. I don't know really how that happens.

I discussed the results of a class with a lively math teacher who had brought in Descartes and "what a peculiar guy Pascal was" into her work that day. She had discussed the personal interests of Pascal. She startled me:

> *By the way, this sort of teaching turns some of them off as well as on. Some want to get on with the mathematics. One said after my class, "I get enough history stories third period. I get mixed up when the teachers start mixing up the subjects like that."*

Modern Math

"There's something everyone can agree on" (followed by a Bronx cheer), quips an algebra teacher. Several of his colleagues agree. The reasons for panning modern mathematics are many. First, a teacher of seventeen years:

> *Most teachers have no idea what it was all about, unless trained in it. Manipulation of bases made sense to me. The practical use of that in computers is easily seen. But it did not strengthen the understanding of most of our students. It confused them and momma and daddy.*

Next, a teacher of three years:

> *I was taught modern math in the fifth and sixth grade so it doesn't seem modern to me.*

Hear now a new teacher who shifted from another career field:

> *In my mind modern mathematics was an unfortunate hoax.*

Another, an FOM teacher, said modern math makes him "a star with the students."

> *I show the students the old quick, efficient, easy ways to get the job done. When they come to me they have no understanding and no ways to compute. By God, they might not understand when they leave, but they do have a way to divide, compute interest, whatever.*

A young male teacher of ALG level two:

> *I see no reason for teaching anyone what a set is in the first few grades. I have seen my younger brothers and sisters who can grasp X+5=10. They know that 5 is to be taken from both sides. What they don't know is that 10-5=5. They can't do the arithmetic.*

Another old pro whose principal work is with the bottom level student shouted:

> *I have [level] 4s, mind you 4s, who are great on set theory, just great; and they can't add or subtract. They do not multiply these, only "times." They multiply everything times the divisor instead of doing long division. Can you believe it? They have the most incredible schemes for figuring out what they are going to put up on the top. It is the most incredible deficiency I can imagine.*

The list could, and did, go on. The pump was primed: all I needed to say was "modern math."

The Students

We have as strong a math curriculum as the child can stand.

"What students can stand" is an issue in River Acres. The faculty and administration see it one way, the students another. The issue is joined where students, teachers and others hold a common view. First, here are a few things mathematics faculty say about their students.

Some of my kids who can compute area satisfactorily on a test really cannot see that calculating running feet of wallpaper has any direct correspondence to computing wall surface area. They know that you do this, and then that, and it works out. But they tell me honestly they cannot see why it does. It just does.

I have students who have very poor ability who love math. They don't get anywhere near as much as they could and should from me in ALG-II. They should not be in there. There is also the group of kids who do very well but hate it.

One student told me "I've been going to school for ten years and nobody's told me what percent means."

In the eyes of a few teachers, students of the seventies are changing--not always for the better. First a little pointed humor.

If you put problems in a money context with junior and senior high kids, be sure to make it more than ten dollars--because anything less than that isn't worth figuring out.

They don't know what 6 times 25 is; but if you say 6 quarters they know in a real hurry.

Followed by a little sick humor:

Just come on by my office and we'll clean the scum off the front steps.

And now a dash of historical wryness:

Level three mathematics was the name of a course [and level four was for tenth graders]. Level three was for kids from minus one percentile to tenth percentile. Yes, minus one percentile.

Which brings us back to the student of today. The day I interviewed this teacher she had a student

. . . transfer out of level two to three because his own business was taking more time [landscaping, own truck, business cards]. An increasing number are working. Before, the prison, a local manufacturing industry, and [the] farm was it for work as an adolescent. Now there are 100 employers in ten miles; and a car makes it ten minutes away.

The last two years have shown marked improvement on part of the kids. The new kids bringing up achievement.

Another facet of today, a vestige of an era past are the "kickers."

Cowboys, teachers were the law. Do what they say. Drink beer, forget college. Structured. In line. They were minority White. They are getting lost in the shuffle.

The new-White, college-bound, teacher-be-damned [are] loose. Their parents raise hell with the administration. So the new courses are invented. The grades don't go down. And the seniors in probability see 1/2 squared, as 1.

The girls' entry into upper-level high school math courses is another part of the seventies that was mentioned repeatedly. Reports a woman:

Even boy/girl split. When you find the girl that is good in mathematics she'll usually take the top off it. But it all depends on the way the mind works--not sex linked.

Reports a man:

Girls: higher in interest, better in computation; boys better in abstraction in the top levels. In the lower ones, no difference.

Girls are now 50-50 in ALG-II. They are very interested in math but are not trained in logical thinking [reports another man].

The men and women teachers, without exception, saw the girl students' upper-level math abilities differently. I asked a woman teacher "why?" She said it was only a "matter of getting used to it." She recalled:

I felt like an oddball in mathematics at the University of Texas. [She was the only girl in her last courses--particularly in the engineering applications courses.]

Parents

The parents of River Acres students are not vitally involved in the math curriculum. Those few instances in which they were mentioned by teachers took this form:

It depends on which parent has been complaining. When a filling station operator comes in, the principal is on my side. When a Texas Instrument parent complains, now we have a problem.

Parents always win regarding levels. After all this is a <u>public</u> [long drawl] school.

A counselor said he told half his advisees they probably should not take ALG-I. They did anyway. "Parents urge them and then us. I put a slip in the file saying the parents demanded it."

A rare teacher (in her eleventh year) was actively trying to communicate with the parents of her students.

I send notes home every three weeks to all my parents about all their kids. All their daily grades and tests for that period plus a written comment on occasion. [One parent wrote her back a lengthy appreciative response.]

Now, a Word from Our Consumers

A spate of student comment on math teaching and learning in River Acres patterns nicely into, "I don't get it" (levels three and four); "How am I going to use this?" (levels one and two); and "It's boring and there's too much homework" (levels one, two, three, four).

An outstanding exception to the boredom rap was offered by a calculus student whose opinion is changing:

> *Mathematics is hard. But it is such a nice feeling when I get it right. Hey, it makes me feel good! Ms. X never lets us know what we are going to do next so it doesn't get boring. There is enough repeat of problems to get it, not too much. Overall mathematics has been boring from the elementary school on--but this course: trig, calc, math analysis, has not been boring. [There were several students who made this distinction.]*

Chance comments by students that stuck out in their interviews were:

> *What gets me about a math teacher is he won't explain, he tells you but he doesn't really explain.*
>
> *Math teachers scare me.*
>
> *Math is something that you just have to use or it seeps away.*
>
> *The mathematics department demands too much--but I feel I got a good background [college]. [For the non-college student], I didn't get a thing out of it. It was boring.*

Students said that math is really the only course where student cruelty one to another is tolerated by teachers. They made this point in recollecting elementary school embarrassments at the board, being called on, etc. Students joined teachers in decrying modern mathematics. Interestingly enough none discussed "back to the basics"--but modern math was on the tips of their tongues.

> *When they figured out how to divide thataway we took one huge step backwards instead of one for mankind. My daddy says they started this because the Russians were going to beat us to the moon. He showed me how to divide faster, easier and I am right more times. I agree with him that modern math stinks. My problem is that my teacher won't give me any credit for doing it the quick way. I have showed my friends how to do it too.*
>
> *Commutative, associative, distributive. They don't mean anything. They don't help you to solve problems. You just have to learn them.*

Kids say that you can't really understand mathematics unless you are willing to put in hours every night. "Even then there's no guarantee that you will get it," said one girl. "It is the only subject that is like that. The chances are that you won't get it and it is so much work to try." And for what? "So you can do mathematics. I don't want to do mathematics in the first place," said one boy. "Teachers even admit it was hard for them to learn. The only thing they do is teach it to other kids."

> *They say how good it feels when they work out a problem. I have lots of ways to feel good [laughter]. No, I mean <u>legal</u> ways. Teachers think that mathematics is something great. Good for them.*

Another girl:

> *I haven't heard anyone, anyone except a mathematics teacher say that math is great. You gotta know how to figure your income tax; how to get money from banks, how to buy or sell stuff, know the stock market and maybe a couple other things and that is it.*
>
> *(The first girl adds) Everything in the world on television, "60 Minutes" for example, is not hard mathematics. The news shows and all, I mean what is all this stuff for except more of it. I am not going to teach mathematics. I am not going to do that stuff. Almost nobody is. It is like a God and you are supposed to believe in it.*

That would certainly qualify, but I chose not to include it as an item in the next topic.

What's The Big Idea?

First, a surprise. Only one teacher in River Acres said anything about the principal idea in mathematics being related to what a teacher does. This from an ALG-II level three teacher:

> *Looking up [materials] that just don't roll off your tongue. I hope my students learn to do that and can use that. I go into a trigonometry class without having worked out the identities earlier or the proofs in the Algebra II. So they can see me stumble through the process. See what I do when I hit a brick wall in logic. How I double back, where I check.*
>
> *I hope they have learned that [the process] when they mix their babies' formula; figure out how to buy their house paint; decide on loans; and look at their PSAT scores.*

Second, another surprise: some teachers who agree with the students that higher math is not useful (beyond taking more mathematics).

> *I agree with them. Eighty percent of what I teach my level three algebra class cannot be used by 90% of the kids. The benefit [only] is to get into college. I can teach them to think logically about real problems in their lives today. I sit in my own graduate courses in mathematics at the university and ask myself, what am I ever going to use this for?*
>
> *Calculus. When a kid is through he has an understanding of limits and can advance place in college at least six hours of mathematics. That's it.*

The plurality: six teachers' views of what mathematics is all about at River Acres is the major theme found throughout the study: to teach kids to think logically.

I read the following poem to one of the teachers. She said it ought to be on the wall of every mathematics teacher's room. "The kids who knew what it meant would get an A."

LET US READ ARISTOTLE

Let us read Aristotle in the evenings
Until we know
How to approach
An idea
And cleanly cut to its center
As we would a cantaloupe
The beauty of the melon
Touching our blade
With its cool being
Scenting the air--
Sweet and good
When we've done.

James P. White

But the rarity of seeing the big idea in real life is what the teachers talked about.

Mathematics can teach the student how to think logically and that process can carry over to anything. To be able to start with a set of facts and reason through to a conclusion is a powerful skill to have.

If a student can go through a problem and think it through logically step by step, that is a thrill! I am displeased when they have not learned their basic [arithmetic] concepts. Frankly who cares if they can remember the theorem that proves triangles congruent? The point of what we are doing is to help them learn an approach to any kind of problem that they've got. I don't limit my classes to geometry per se. We cover the work and do extended logical thinking.

One teacher asserted her major purpose lay in the application of math.

Not exposure, rather it's learning what can be applied in the real world. Can he use algebra in figuring the rafters on a building? Not knowing the theory in high school hasn't hurt me. I knew how to use math long before I was told about the great abstractions behind it.

I conclude this presentation of math's purposes with a group of three teachers who have lower-level courses and sections.

I want them to know when they're getting ripped off.

If they can balance their checkbook, I'll rest in peace.

How to use money in a capitalistic society--that's math with a bang!

Help Wanted and Advice

On the math faculty's Christmas wish list were smaller classes, an overhead projector in each room and more NSF summer institutes. Adjustments in the curriculum were advised.

We have music teachers who go from grade to grade because they can play the piano [in elementary schools]. Why not have a math teacher going from grade to grade because she knows her mathematics.

Elementary mathematics teachers may know how to teach mathematics but they don't know mathematics. Really, I guess they don't know how to teach it either if they don't know it [mathematics].

I need more application examples from everyday business. That's where most of my students are heading, where their fathers are. They want to know more applications than I can give them. I know they exist. I know the theory but go blank when more applications are required [calculus, trig, ALG-II applications]. I can sit down and grind it out with them. We need some training in business.

We need to be more concrete in our applications in our most theoretical courses. Trig and the calculus for example. The reason that we are not is a lot of us do not know such applications.

In this district and in others we don't stress basics. More and more teachers in all districts around here [are doing it]. I asked my classes how many of them have savings accounts. About 75% do as freshmen. I asked them if you had $3000 saved and the bank was paying 5 1/4% per year, how much would you make? I had two or three in each class that could tell me how their money earned. Percentage is a basic idea that you have to learn.

One cared enough to send a message to teacher educators:

> *I had no preparation to deal with level 4s--even 3s. I just never knew how hard it would be. Times and kids are changing. One day we discussed retarded children in my mathematics class. I think they learned something and it might keep their interest in coming to the next class. One kid finishes in five minutes and another works the whole fifty minutes on the same problem. I am learning by the see-and-do method. I think maybe a special education course.*
>
> *Part of it is the frustration, the extreme disappointment; you need preparation for this. You've taught them, they've known it, they've been tested on it; they've succeeded, and two weeks later they don't know it anymore. That kind of preparation would be awfully hard.*

I got some unwanted advice in the guise of Texas humor one day in the math teachers' conference room.

Teacher: *Are there going to be some more monumental sweeping changes as a result of your study?*

Denny: *Not likely.*

Teacher: *Good. I'd like to see researchers' sweeping changes swept away.*

The department clock in mathematics was 10:00 when I began this study and when I left River Acres. Mathematics instruction is timeless but I'll offer a direct piece of advice to River Acres anyway: "Fix your clock."

Central High School Social Studies

The course curriculum in the social studies begins at the tenth grade for most students with world history. This is required as is the eleventh-grade U.S. history. In the twelfth grade most of the students take a two-quarter economics/one-quarter required government course. In addition there is an advanced placement (college) U.S. history offering for the very able twelfth grade and psychology and sociology courses which are not leveled. A very small number (2%) take a "major works" world history course in the tenth grade.

In addition to the course curriculum a group of about twenty students is sent from Central to visit the federal government in action each year. In a similar manner the federal building in Houston is visited once a year by a group of seniors.

A year or two ago, a Latin American history course was offered in anticipation of interest by the Mexican-American students and perhaps the Anglo students. It was cancelled due to lack of enrollees (they needed fourteen).

The task of covering U.S. history in a year is a tough one according to several teachers. They attack it in various ways. "On your mark, get set, go, is my approach," confided one. A second said, "Trying to teach from day 1 to 1976 in one course in one year is impossible. So I skip Africa and the Incas." Newer approaches are being tried by individual teachers. "It used to be Betsy Ross sewed the first flag and Nathan Hale regretting the number of lives he had. Now I am more into 'whys' and 'ideas' with dates not stressed." I asked a group of teachers if they were worried about making social studies more relevant to their students. One said, "We sure can't go out and hang ourselves to get a hanging experience."

Most Central social studies teachers use a lecture-discussion approach to their textbook curriculum.

> *We live with texts for five years. Next year we get a new text in world civ. "No fewer than two, no more than five" is the selection committee's charge. Old texts go to the shredder. Too bad, we could use parts of them.*

There is an on-going effort to regularize the scheduling of topics within a course. Coordination is sought so that if an outside activity requires a student to transfer from one class to another, that student will not lose time. An administrator describes two U.S. history sections:

> *At the end of the first quarter one teacher might be teaching World War I, another the post-Civil War period, and a third the Columbian period. Literally true. Now that is independence that is intolerable. When a kid has to move from one course to another he should move from Jacksonian democracy to Jacksonian democracy.*

I checked this out with a group of seniors who had been in different U.S. history sections (all level two and three). They agreed that sections are often not on the same schedule, but did not care about the problem as a teacher might. I shared the previous quotation with them.

> *It's no problem if they aren't exactly at the same place when we are. We don't really care. You can catch up if you have to. I don't see why it makes any difference anyway. My parents don't know the difference between Jacksonian and Jeffersonian democracy. They graduated from college and earn a lot more than Mr. X does. I know the difference and I guess it's important to know where people fit into government. You really don't have to know that it's called Jacksonian, do you?*
>
> *Anyway, that's not the point. The point is nobody <u>really</u> knows what difference any of this stuff makes after school [is completed].*

Curriculum organization has been hampered by the independence of the social studies teachers, the department heads, and the principals at the junior and senior high school, according to one high school teacher.

> *It's nice [individuality], but antagonistic to program development. We have tried to attack this for the last two years. The state requires us to use behavioral objectives to get on with it. Why? I don't know. No answers, just directives. Most of it is a waste of time. It will not actually be used. But it does force us to think about what is important in the social studies. We spent one fruitful hour on that and 100 to 150 hours in getting the words in the right order for sub-sub-sub objective forty-six. We don't have room for a "minor social studies event" like a Nixon resignation. No sub-objective for that one, but we have the third person in succession to become President pro-tem of the Senate. [He asked me if I knew who that was. I told him Nick Barf.]*

The district's efforts to regularize the curriculum through the development of a <u>Guide</u> which employs the writing of behavioral objectives has won few enthusiasts. "I think the district should get its money back from whomever was paid to write them," pined a second-year teacher (I said nothing).

> *The literature says that individual differences must be the base for the social studies. This district is going against the trend. Someone in this district has taken it upon himself to standardize everything. You can't do it in the social studies department. You get corralled into doing the same thing year after year.*

The pattern will be set and if the President is assassinated, I'm not supposed to dwell on it if it isn't in the curriculum. This year when I get to Rome in world history I'm going to stay there a while. Why? Because I am fired up about it. It is neat because I have just finished an intensive study of it. What will the behavioral objectives say about that? Try to write content objectives for current events sometime.

Three teachers agreed that social studies ought not to be standardized, that performance objectives are of little merit. Of eighteen in the department, only one is known to think B.O. is useful.

More simply put, a member of the group that worked on the objectives said, "I shoved that in the closet a long time ago."

What's The Big Idea?

Well, for one thing it is not apt to be found in the psychology or sociology courses, which were described as "something we throw in to fill out their year's schedules because of the quarter system." An old hand advised, "Those courses aren't social studies. I don't count anything that wasn't here when I came here." Then there were the teachers' suggestions that the big ideas were appreciations of "cultures present and past," or

A way of thinking critically about issues for themselves and an eclectic view of the world. To satisfy the district all you have to do is be there and teach the textbook. But none of us are here for that. That is where we all start and our own individual identities, which cannot be standardized, take us beyond that.

This view caught me unprepared:

The big ideas in social studies are not the most important; reading and writing are. But if you want to know what is really important look at the instructional budgets. What's important is athletics. They can shift kids by the bus-loads to games, to contests, matches, whatever because their instruction is important. We cannot take advantage of an opportunity when it pops up. When we ask for a trip for a class of students, the answer is no.

Other nominees for the big idea in social studies were:

To know thyself and the functioning of our government; our economics and basically how to make a living. All are important to prepare the student for society.

I try to point out how important people in history make their decisions on the basis of the information available to them. These kids have a hard time making decisions and history can help them.

[Teacher] education courses stress the humanistic side but I think it's important for students to be educated, to be well rounded, to know something other than what he thinks is important. At age fifteen there are things that are important and at age twenty-five and forty there are things that are important. We should also teach social skills for citizenship. I must admit that I stress knowledge [acquisition]. I think it is important for someone to have knowledge. When I hear the broken record "Why do we have to learn all this, I'll never use this," I say, "Anybody who talks about the same thing all the time and cannot relate to what others are talking about, or can't relate to some quote or quip or reference is a sad thing."

Instructional Levels

The top level is called "major works" and it exists only in the tenth-grade world history course. For the first time it has been offered in the twelfth grade as an advanced placement U.S. history course. The prerequisite is a B or better in English. I did not observe them nor did I talk with any students who had taken the course. The instructors obviously enjoyed talking about the "major works" courses.

Level two is called "the club" by some of the social studies faculty. It is comprised of students who are economically and socially in the "right group." Almost devoid of Blacks and Browns, these students pal around and go to the same after-school events together. They are seen as rarely taking school seriously. They exclude others from their group and the level three and level four students know this. ("The 4s have their own 'losers club,'" a science teacher observed previously.)

Two teachers of world history raised serious questions of how well the levels work in general but with special reference to the 3s and 4s.

> *I don't like my levels. I teach a level four class and they don't all belong in there. But they all turn out level four work. They think that's all that is expected of them. Academically there are students in there of the following varieties: cop outs, nonreaders, heavy personal problems, and others too numerous to classify.*

> *[Another teacher] . . . There are no criteria for levels. None of the counselors have come to me to ask if this kid is a level two, three, four [eight years]. A kid is in level four because somebody outside the classroom has designated them as a classroom level four. They say they can't learn on level three. That's a mistake. Within my level two class, I have two or three students that are super. The rest I could label level four.*

Another teacher of world history said he taught the same thing in level two and level three sections:

> *I just expect more from 2s. Level four is something else; it's hard. Deep down inside we know that they can't get the information or can't see any relevance at all. Most are slow readers. Many will not finish school. . . . And whether Alexander conquered 10,000 or four miles is not going to be important to them in where they are going. And yet they are required by state law to take a world history course. We would like them to conform as much as they can--but they have such a barrier.*

Another world history teacher of many years experience spoke with emotion about teaching the level fours.

> *I like to take them where they are and see if they can progress at all. I think it's the family environment and language barrier plus a lack of education in the home background. Try to see that they can be a useful citizen and contribute to the local government where they live. We have a unique unit in this economics which we call necro-economics. [He created it.] When we bring in a mortician to present the information you would be surprised to know how much good it does these kids to know about that, the cost of dying. It works well here.*

Another informant, a teacher new to the district, was "drawn to the district because of its leveling policy. One of the main reasons I came. It is the only way to really teach concepts and skills."

Two U.S. history teachers really got into it during a teachers' lounge discussion that I taped one afternoon. It points up the differences in how teachers approach the task of teaching level four sections in the same course. The first speaker is in her first year in the district, the second is in his tenth.

We are geared up for the college bound. Nobody could say we are doing anything beyond neglect for the lower end of the spectrum. We make them learn things that are certainly worthwhile but I think we need to get back [of the problem]. Teachers need things that don't exist. It is easier to redirect a learner in two [level] than it is to get a 4 going. First of all we need to get the group down, way down, to fifteen in a class. You can find materials and adapt them if you can work with them. It doesn't seem to make any difference if I take a group of 4s and have to work with thirty of them using simple materials. They still can't read, you know. I have a couple sandbaggers that make me beware of labels. The lower-level kids are almost never taught by the better teachers who have been here for three or more years.

I disagree. I taught level 4s and had smaller classes. You can't give them special materials. They want to be just like the level 2s. They want to carry around a book and not be singled out by this time. It does make a difference in the amount of discipline problems you have by having smaller classes. Mine never learned any better if there were thirty or fifteen. Head Start is the only way to help them--smaller classes in the junior year is too late. They are proud and don't want to sit around with kindergarten reading materials. It cannot be done in the school room in high school. You could put them with a very special kind of elementary school teacher who knows how to teach reading. We are not skilled in teaching reading.

The department head justified the need for levels in quite practical and humanistic terms. In addition to levels he covered other ground as well.

Those kids give me a tremendous kick when they turn on really lively discussion. To see them start to read a newspaper for the first time. So I take it personally when something comes along that will keep me from doing the thing I love best, which is interacting personally with kids. We are in the people business. It is people we are teaching and not social studies, and we are teaching about people. Levels are ok because you can't have good discussions with a small number dominating the discussion, and that happens when you don't have levels.

The Students

Change in student behavior attributable to recent growth in River Acres is discussed more by social studies than by the mathematics or science teachers. It is possible that social studies teachers merely talk more about students' social behavior since it is relevant to their field. Whatever the reasons I heard a lot about and from students in this department. In passing I note that I saw no different behavior on the parts of students in the social studies area that I did in the mathematics or science areas. My personal impressions were that they were a reasonable, mannerly, decent bunch. Some of the faculty did not share this view.

R-E-S-P-E-C-T--The kids sing it while they show complete insensitivity to the person who sits next to them, to one another in the halls; sadly, to themselves. Forget the adults. . . . Property, my gosh! It's there to be abused, tossed away. Don't you think for a minute I am talking about kids of color, or about the three- and four-level kids. I'm talking about kids, period. It's the executive's kids as surely as the bottom of the social ladder. The punishment isn't equal, though. One kid will get suspended and a second allowed to take a final exam for the same offense. That's how social class gets in the back door. [Band kids caught with grass on a road trip, Mexican-American kids caught with it on the parking lot.] Kids reflect the society in which they live. What we are looking at is our society.

Another teacher, this one an old timer, said it was this year that he encountered his first verbal sparring match with a student; and a third decried students' attitudes toward homework. "Give them a homework assignment in history and they just get hysterical." "Economics, psychology, sociology, and world history, too," chimed in the two others. This general description checks out with other teachers and the students' views themselves. The principal factor which underlay many students' negative attitude toward homework was another kind of work.

> *Kids are getting more and more jobs. Getting good grades is not as important as getting money. These kids want out. Especially level three and four. They own cars or get to keep one that mommy and daddy give them. They aren't motivated to get good grades, to [then] get a good job, to then get money. They are motivated to get money today.*
>
> *We used to get 100 kids to see an agriculture film easy, twenty years ago. You can't get twenty-five to watch the governor of Texas ride a five-legged horse through their backyard. If you set something up here at school and it interferes with their favorite television program, you've "had it" so to speak.*

The television theme was a rich one and I pursued it for hours on end with faculty and students alike. Listen to an economics teacher first.

> *I put the blame for it [lack of work in social studies] on television. Children today learn by watching the television from the time they are two. They have to put out little effort from the time they see Sesame Street; they have to put out no effort to learn anything. They absorb it via constant penetration into their daily lives through television. They learn and they don't know they are [learning]. So when they get to a curriculum or study where the effort is necessary to learn they really can't understand why. [They say] "I'm a bright kid and I'm fifteen years old and I can't see why I should work to learn this stuff. What I know all came fairly easy because of exposure." When they get to a course like world history the only way you are going to be able to absorb any of this is by listening to the teacher, or by reading the book or seeing some audio-visuals. That's the only way you can internalize any of this. These are difficult things to do; they require concentrated effort on the kids' part to learn. They are not disciplined by the fifteen years of TV learning to put out disciplined effort. Learning has been easy in life. My own daughter has been an easy learner. School was easy because she knew it beforehand. The first time she had to learn anything it shook her up. It still does. For a lot of kids it takes failure in a couple courses to snap them up.*

Now listen to a group of level three senior students reply to the charge.

> *Teachers who complain about us watching TV and liking it and not liking school make me laugh. I mean, do they ever really look at themselves? It's hard here for them and for us. It [school] is mostly no fun. Teachers know it. They'd have to be blind not to. I guess mostly we are talking about a few teachers who can't see social studies on TV when it's there every night . . . more social studies there than in any book they got.*

Some of the students' and faculty's fingers point to the home, and to the parents when explanations are sought for the apparent change in student attitudes toward school.

> *I'll draw you a hard-edge picture of our incoming parents: they want straight A's for their daughters and good grades from their sons. They don't care where it comes from, what the kid learns. They want to see the grade. Do well on achievement exams, go to Yale and Harvard on full-time scholarships and have the boys be football and basketball heroes. And [daughters presumably] cheerleaders, rah, rah, rah.*

The picture is a bit overdrawn as the students see it, but they can see "some truth in it." One articulate "major works" senior said the "school was clinging to a day gone by, and we are living one not quite here." (I told him he should write poetry. He told me he did.)

Faculty and student criticism are joined on two issues: there are "faculty who do not like kids" and "faculty who do not expect kids to work." Two other criticisms made by faculty were not mentioned by students: "We do not have a way to insist that teachers remain alive" and "We have teachers who basically do not like the subject they teach." These four issues came forth in a discussion with six social studies teachers in the lounge as the principal self-criticisms that they would regard as being "serious and fair." (Note that they did not fault the students in any of these!)

Veteran teachers estimate sixty to seventy-five percent of the students who graduate will go to college. One estimated that as few as ten percent would finish college. Another way to bracket the college-bound students was offered by another old timer who said that "sixty percent of the [kids'] parents could afford it financially and twenty-five percent should go." The direction of the discrepancy is always the same: many more River Acres students will go to college than should, ought, want, or are prepared to.

Social studies teachers think that the achievement of girls is usually higher than that of the boys in <u>all</u> courses. There is no comparable feeling for differences in interest. There are

> *. . . always a couple boys who talk more than any girls, outspoken but not necessarily knowledgeable. Girls are just more reticent. A visitor to my class would get the wrong impression that the boys were more interested and knowledgeable from the interaction.*

A fourth-year teacher of U.S. history has her rule of thumb: "Girls are always for the grades, and boys are usually for the present interest." "Yeah, and the present interest is in the macabre," threw in a listener, "like the Bubonic plague; that's always a big hit." "Don't forget Auschwitz and Marie Antoinette," trilled another from the Coke machine. (It had been a long day.)

On a more serious note there is the matter of the interest and achievement of Black and Mexican-American students. "I always have one or two Blacks that are 'superstars' in my basic courses: smart, witty; but most of them will fail in their average classes." One teacher had this to say while two colleagues listened in apparent agreement.

> *I don't think they have much interest at all in the social studies. I believe you find many more of the Mexicans showing a lack of interest in it than the Blacks. They are not academically interested. They are more interested in the career fields, shop, vocation. When you look at your level four classes you see brown. We feel terrible about it and ask what the hell can we do? In the major works [level one] you rarely, I mean rarely, have a Mexican-American and very few Blacks. [This is River Acres' first year for a level one world history and its second for U.S. history.] A little more advanced level than average is level two; you will see very, very few Mexican-Americans or Blacks. Like in my classes I might have out of an average size of thirty, I'll have maybe one Black and one or two Mexican-Americans. [He estimates that in the district there are 15% Black and 15% Mexican Americans.] In level three, the average group, you see a few more [five or so] and then in level four it is 90% Black and Mexican American. They are reading . . . they don't go by IQ's particularly, but . . . they are slow, have a rough time, apathetic.*

[Beginning teacher] In my class of twenty-nine in American history I have three Blacks and two of them failed, and two Mexican Americans and both of them failed. In my average classes they usually fail. They are almost destined to. Three out of four chances. I am speaking strictly personally; it looks like an attempt of the counselors to try to move a few Mexicans and Blacks out of the basic classes into the average classes and they can't cut it.

Cross-grade Communication and Back to the Basics

The discussion of the relationship of high school social studies to previous social studies instruction in grades K-8 could be dismissed flippantly: "We wave to one another on in-service days."

There is a bit more to it than that. It is related to the notion of "back to the basics" in several social studies teachers' minds. It goes something like this. Formal instruction in the social studies should begin in the first grade.

Democracy and our heritage for about five minutes a day. Democracy can't be taught in a course in the twelfth grade. Too late to begin to discuss citizenship, fairness in eleventh grade. "Back to Basics": Kids need to learn to read and write, to know what a continent and a river are, where Africa is, the difference between New England and England, the basics about rules in democracy, right and wrong and the law.

Apathy and dishonesty are the symptoms of kids not having the social studies basics and we have the kids to show it. Evidently we are screwing up along the line. The best of them will cheat off of somebody else's exam if you don't watch them like a hawk. Copy someone else's homework.

It was in the context of articulation that a rare mention of open-space teaching occurred. A young teacher said it was a "fantastic idea even though I have heard it is tough to implement." The veteran teacher said, "It is distracting. I couldn't stand it." The young teacher then continued, "It could never, never work with level four and probably never with three. But if they were started early it could work with the 1s and maybe with the 2s."

World history teachers regularly reported that their students had poor writing, research, listening and reasoning skills. (The students themselves supported the writing and listening deficiencies charge.) One world history teacher offered a most unusual interpretation of "back to the basics."

Back to the basics is the flag, the Pledge of Allegiance and George Washington never told a lie.

For another, "back to the basics" means the demise of strategy and simulation games and similar techniques for teaching problem-solving analysis in the social studies.

[A student observes] School is a matter of sitting down and studying.
[Another student] Like Mrs. X says, you got to take your medicine now if you want to get into a good college. That's what we are here for. The group projects and games and role playing stuff is not what we are here for.

That delightful Texas brashness came through when I asked one of my final interviewees which of the several meanings he preferred in thinking about "back to the basics."

Whatever the hell it means we are all for it. If you get kids in social studies who cannot read or write or speak you're stuck. We waste so much time saying "right" on a wall map is "East." Any right is East, up is North. A continent is, the equator is, a peninsula. . . . Basic ideas such as culture, nationalism, how a bill becomes a law, what a constitution is, legislation, patriotism are foreign to them when they come to the tenth grade. I mean most of our students.

The Teachers

The faculty is about evenly split numerically between world history, American history and the economics-government courses. This department evidenced more concern about the concept of accountability than did the combined mathematics and science faculty with a few other feeder schools thrown in for good measure.

Accountability is what is on my mind when I give out grades [level three courses]. If the teachers gave all A's the administration would be very happy. They are much more concerned about how parents think we are doing than about how we are doing.

No one mentioned the use of the district's achievement testing program for accountability, or for instruction. An American history teacher said that accountability was going to result in a loss rather than a gain.

It means behavioral objectives, standardization, sameness. Why be a teacher if everyone has to use the same text, be on the same page the same day, teach for the same fact-objective? A part of learning the world we live in is learning to get along with lots of adults. Kids have to learn to adjust to the variety of approaches teachers have. Accountability is aimed at the bad teacher but it will miss him and hit the good one clean between the eyes.

The bad teacher will now have to teach badly in an orderly fashion. If you don't mind my saying so, when the bad teacher gets his shit together it is still shit, ok? For the good teacher it is going to hurt them a lot. It'll douse their fire.

Another spoke of accountability that had to be district-wide in the sense that a curriculum failure in the early grades would show up in teachers' work in the later grades. The problem is most readily anticipated for the level-four students.

He is there and nine times out of ten he doesn't care. You have to try to teach him the best you can but you cannot be held accountable for his learning. (Most of the level 4s are boys.) Most of the girls try hard. They just don't really have it. I worked with them. A new teacher comes in, is all idealistic about these slow students. They have come out of these education courses where they are all idealistic about these students without realizing what they really are like . . . what their home life is like. You've got to take that into consideration. I mean you can't <u>expect</u> a lot out of those students if you go and look at the homes they live in. No wonder they can't read; you see, you as a teacher can't change that. You've got to accept it. If you're going to help them, you help them before first grade.

A final view has a dash of humor to blunt its barbed thrust.

Accountability is the taking of your textbook and writing objectives for everything. Your curriculum guide objectives, goals, I mean it's really just stupid. We ask, what are your goals; what is the learner supposed to learn? My God, what is he supposed to learn? He's supposed to learn the Civil War! I don't want to put it into a bunch of fancy words. A curriculum <u>outline</u> is good, needed: I can understand that.

A young faculty member begins the following accountability quotation and a teacher of several years picks it up.

There is no academic environment to speak of. No personal competition. I am not speaking of who gets the best grades as a form of competition. I am speaking about "I am better today than I was yesterday. I know American history because I've studied it and I know how to learn more of it." I believe we are moving toward an increasingly anti-academic attitude in our school, while the student achievement is rising at the same time.

[A second teacher says] The direction of teachers' time toward writing behavioral objectives to fit the text is more of the anit-intellectual attitude of the schools. I would just as soon they buy objectives from California ready-made and let us modify them as we see fit. I think work on the concept of quality of student work could make a difference in real academic work. Behavioral objectives don't make any difference--any positive difference.

For all the criticism of student attitude and the teaching climate there was high praise for the spirit of academic freedom that the staff felt prevailed in their department. Student teachers commented on the faculty esprit de corps.

I saw several instances of the world history group helping one another, obviously enjoying being in school with one another (in front of the students!). Students commented on the ambiance of this section: "It is so obvious that they get along with each other that it is contagious." (I wondered if they had read the Faculty Handbook?)

FINAL MESSAGE FROM THE CLASSROOM

Conclusion needers will find these few observations unsatisfactory in that they represent overriding observations and concerns about what River Acres has done, is or will be doing. For the conclusion needers I offer the old saw: "For every complex human problem there is a neat, simple solution and it is almost always wrong." My last Texas poet reminds us of the puffery, fragility and fun of the author's task.

AUGUST 31

Inspiration tense
climbs up my back and into my head
Got to turn them words right around
Strip 'em clean and let 'em strut their stuff
Get rhythm, words
Worddsss worddsss word them words
thas right Daddy word them words
do a fine job now Pappy
jest gotta word them words hallelujah Honey
shit if them words aint got soul
jest watch 'em dance Mammy shoooee
word them words thas right Daddy
whoooee

Grady Hillman

In a way I wish I had met Miss Margaret the first day of my study. She said a lot in a few words. Two days before I left the district she came into the high school faculty lounge and asked me what I was doing in the school. I had been warned that "she would tell me how the cow ate the cabbage." I told her I was looking at teaching and talking with teachers about their ideas about science, math and the social studies. She was appropriately unimpressed.

> *If you're looking for crazy ideas, pass on brother. Those college people with crazy ideas should try them. California would be a good place. We'll watch and follow accordingly. Those "crazy" ones that prove really sensible, we'll get to them by and by. Meanwhile we aren't going to shoot the moon on any more of this nonsense . . . [new math, ungraded schools, new topical courses].*

An elementary school teacher who was trying to cover fifty years in a coffee break told me the thing I

> *. . . had to learn most about our schools is that change comes very slowly to River Acres. We had it good and knew it before all this started to happen. The old time Houston farmer made sure there were twelve good years of public school for his kids. Those who couldn't cut it didn't deserve to. They have always had a good college-bound curriculum. Then they sent their children to the best schools to get away from the dust, the oil and the cattle. That won't do anymore. Some may yearn for it but it just won't do. All kids need to get their chance.*

The administration of River Acres sees architectural change as providing opportunity for more children "to get their chance." But open-space education, now a few years old in River Acres, came from the "top down" and is embraced by few of the junior high and nearly none of the senior high school faculty. For the detractor it represents how change occurs.

> *If you want to see where Texas is going in education, check where California was five years ago. We just follow, we don't learn. We have California's open schools of the 1960s, with one problem--the concept crashed in flight coming over the coastal chain. We ended up with closed education in open architecture.*

In the River Acres School District I found an easy-going administrative style that accompanied the helter-skelter day-to-day problems of rampant growth. The citizens by their absence at school board meetings are saying "things are all right." Simultaneously, a group within the district is working toward municipal secession from the district, a maneuver encouraged by Texas law. The easy-going administrative style masks an informed concern. They are aware of what is going on behind the scenes. One parent said the superintendent had more news sources than Deep Throat.

Others feel the administration is caught in a responsive rather than a leadership mode. They assert that the pace of change in River Acres is more than it can handle. "Who could handle it?" I asked. "A young, sensitive Texan who could make us proud of what we are--and who ate hurricanes for breakfast."

One of the storms that reoccurs regularly for the administration is the practice of grouping. How many levels; what criteria to use; and what are its effects? The conventional representations are made. There are calls for more instructional levels, for as many as seven in each grade in each subject. There is a top administrator who wants fewer instructional levels, "two would be about right."

The profound humanistic issues that lie at the heart of grouping were revealed in a discourse by a junior high school teacher.

I have taught in a system that tracked from kindergarten on up. When you get grouped in a small town it's like branding you with a letter on your forehead: "smart, medium, dumb." You've got to live in that community the rest of your life. If you were branded "dumb" when you were five years old you were going to be called "dumb" when you were fifty-five and you may have been the genius of the community. You have been labeled and you would be with that group of kids all the way--for as long as you stayed in school.

It might be that you were just sick the test day, didn't hear well, saw things wrong, it could be that you are a late bloomer; there's all kinds of things. But once you track these kids there isn't any way to get them off the track and you can talk administrators until you're blue in the face and everyone of them will tell you, "Oh, we re-track, we re-track."

Get a hold of the records on kids and you'll see that they are not re-tracked. In fact the one kid in ten, no, one in twenty-five, that gets re-tracked is so rare that everyone points to it as flexibility! If you tell a kid he's dumb in the first grade, he's dumb in the second grade, he's dumb in the third grade, I don't care how bright he is; he's figured it out, he's supposed to be dumb and he-will-be-dumb-in-school!

I have taught the accelerated child from the first grade on and the ego problems are severe. They are told they are a whole lot smarter than they are. They have terrible relations with the other students often lagging behind in emotional common sense. Further on the kids hit high school and college and POW! It's quite a jolt to discover that they aren't the only smart people in the world. And when they don't make the top grade on that first calculus test they think the universe has folded because they've never made a C before. They have never been in a classroom where people make a C and don't jump off a desk to commit suicide--where you take it and sorta grin and bear it. They have missed a lot of learning from the C students along the way.

The philosophical worrying of what schooling in River Acres is and shall be is a luxury not available to most of its administrators and teachers. They are busy building a new educational bicycle while they are riding it. Whatever is done in River Acres, it will not be characterized by the abandonment of coherence and order.

Ms. Helene shared a world view with me that went to the heart of the matter of education, schooling, parenting.

Schooling is fundamentally illusory as we practice it. Open space and traditional space fall into the same trap. Everybody runs around doing things <u>for</u> children, for students. After a short time even the dullest teacher starts to see that not much of anything he does makes much of a difference. It's what students do that makes the difference. Now what is a teacher to do? Keep up the illusion? Keep <u>doing</u> things and call it teaching. Give the kid this and then give the kid that. Nobody ever gave me anything worth anything until I didn't need it.

River Acres teachers may not dazzle you with their pedagogy but the depth of their understanding of education cannot lightly be dismissed. A sense of purpose is what has been called into question by this last teacher, as it was by many others before her. Texas poet Quintana enhances our appreciation of Ms. Helene's view.

HEREDERA (heiress)

"when you grow up,"
my wife tells sandra
the oldest daughter
"you can have
all my indian jewelry."

immediately,
the proud heiress
of turquoise and coral
makes her first proclamation:

"and when you get little,
you can have all my crayons
and coloring books."

Leroy V. Quintana

A science teacher I was to interview missed her appointment, so I wandered the Central halls as I did on occasion. I had an hour and the muse led me to a poetry teacher seated at her desk during a free period. I told her what the study was about and she told me what River Acres was about.

Who are we? We are the sons and daughters of ne'er do well sons of the East who came West. We are Virginians who lost our graciousness, kept our goodness and increased our gumption.

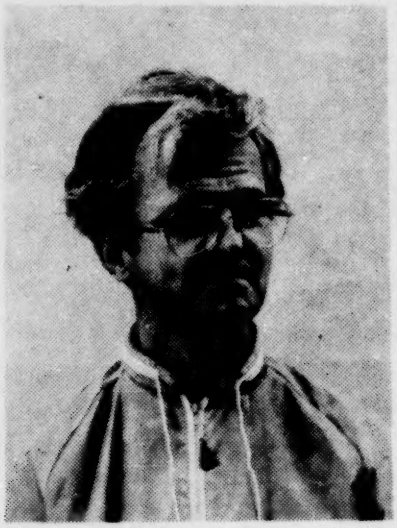
This time of year I miss the clan gathering, where we sit around and tell the stories of River Acres; where the religious concepts and work ethics seeped through every tale.

We have a passel of old fashioned concepts that I very much admire. I have taught around the world and have returned home. A different home, a different person; but home. Some sophisticates would listen and call it corny. I call it good.

I know the good she is talking about: some still do. Education professors have large, incomprehensible words to discuss educational issues such as those found in River Acres, Texas. These teachers rarely hid behind their words. They taught me the small words are the good words and the old words are best.

I left River Acres hoping it would be there when I return, knowing that it would not, and feeling that it would be better than it was. Like ice fishing, trying to explain it to somebody else is ridiculous.

TERRY DENNY



Before assuming his current duties as Assistant Dean for Graduate Programs in the University of Illinois College of Education, Terry Denny held appointments as Evaluation Specialist and Professor of Education in the Center for Instructional Research and Curriculum Evaluation (CIRCE) and, later, in the Committee for Culture and Cognition at the University of Illinois. Such achievements are particularly impressive, he notes, for a person who was once blocked for promotion to Associate Professor at Purdue in 1963. He has taught in public and private institutions from first grade through graduate school in departments of psychology, elementary education, and educational psychology. By his own admission, his teaching has been "uniformly brilliant."

Among the highlights of his professional career, he includes working with Reginald A. Neuwien and George Shuster on the National Study of Catholic Education, 1963-64. (Terry directed the research department in that study.) He also served as the first research director for the nation's only independent, non-government consumers' union for educational materials, the Educational Products Information Exchange (EPIE).

In addition, he has conducted evaluations of ESEA Title III programs, learning centers in maximum security prisons, instructional television, and special education. Both the

broad spectrum of his educational interests and his experience in the evaluation of teaching materials are reflected in his research and his writing, which includes publications in Catholic Education Review, The Reading Teacher, the Journal of Educational Measurement, Elementary School Journal, Educational Researcher, and Educational Product Report. He has also written working papers for CIRCE and co-authored (with Robert Stake) the chapter, "Needed Techniques and Instruments to Utilize More Fully the Potential of Evaluation," in the 1969 NSSE Yearbook on Educational Evaluation.

Born and raised in Detroit, Michigan, Terry received his Ed.D. from the University of Illinois in 1962. He and his wife, Phyllis, are the parents of four children and live in Urbana, Illinois. In response to a query about important details of his life, Terry volunteered that he is a Roman Catholic, an anarchist, and he speaks respectfully to Lithuanians.